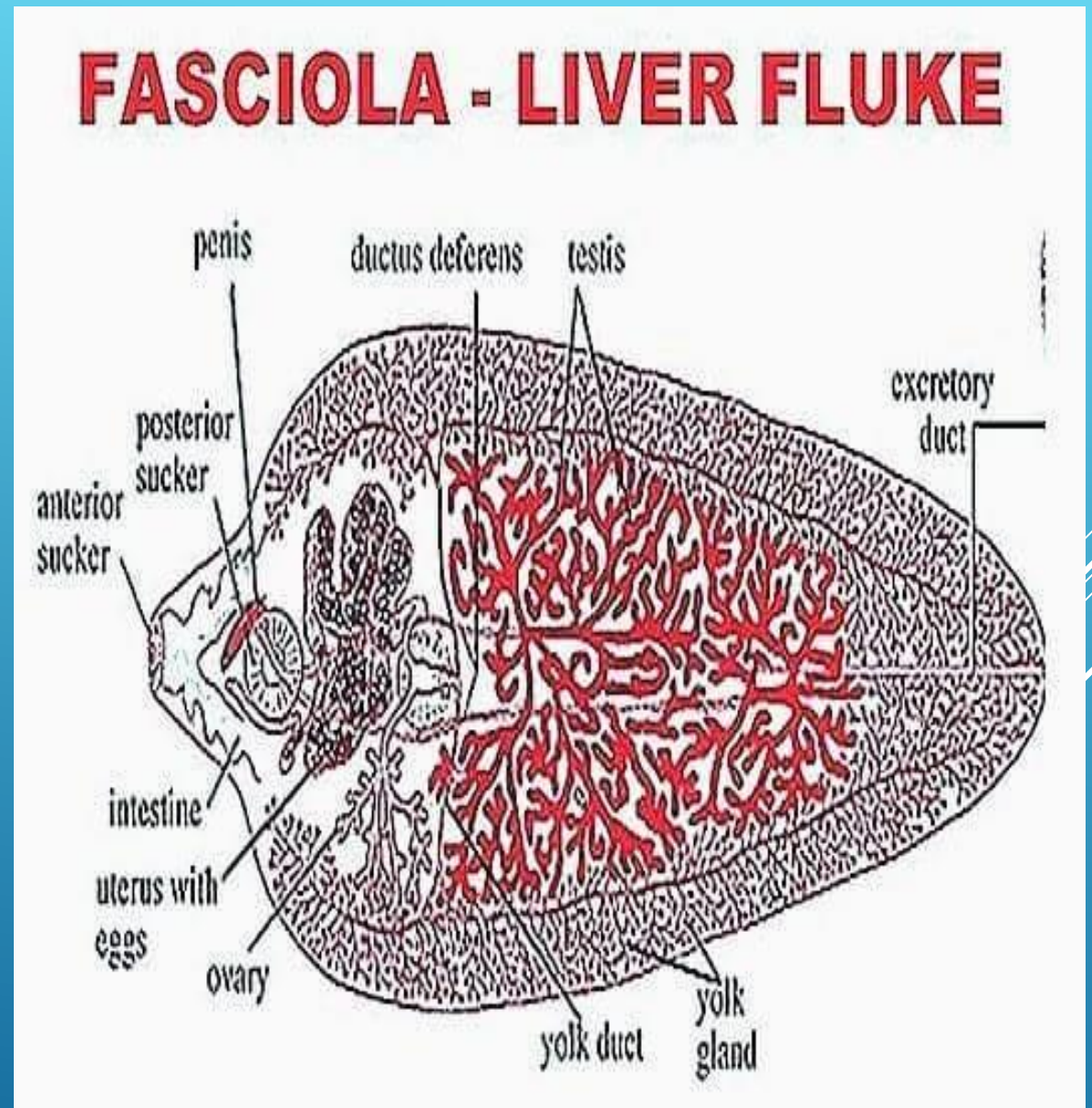
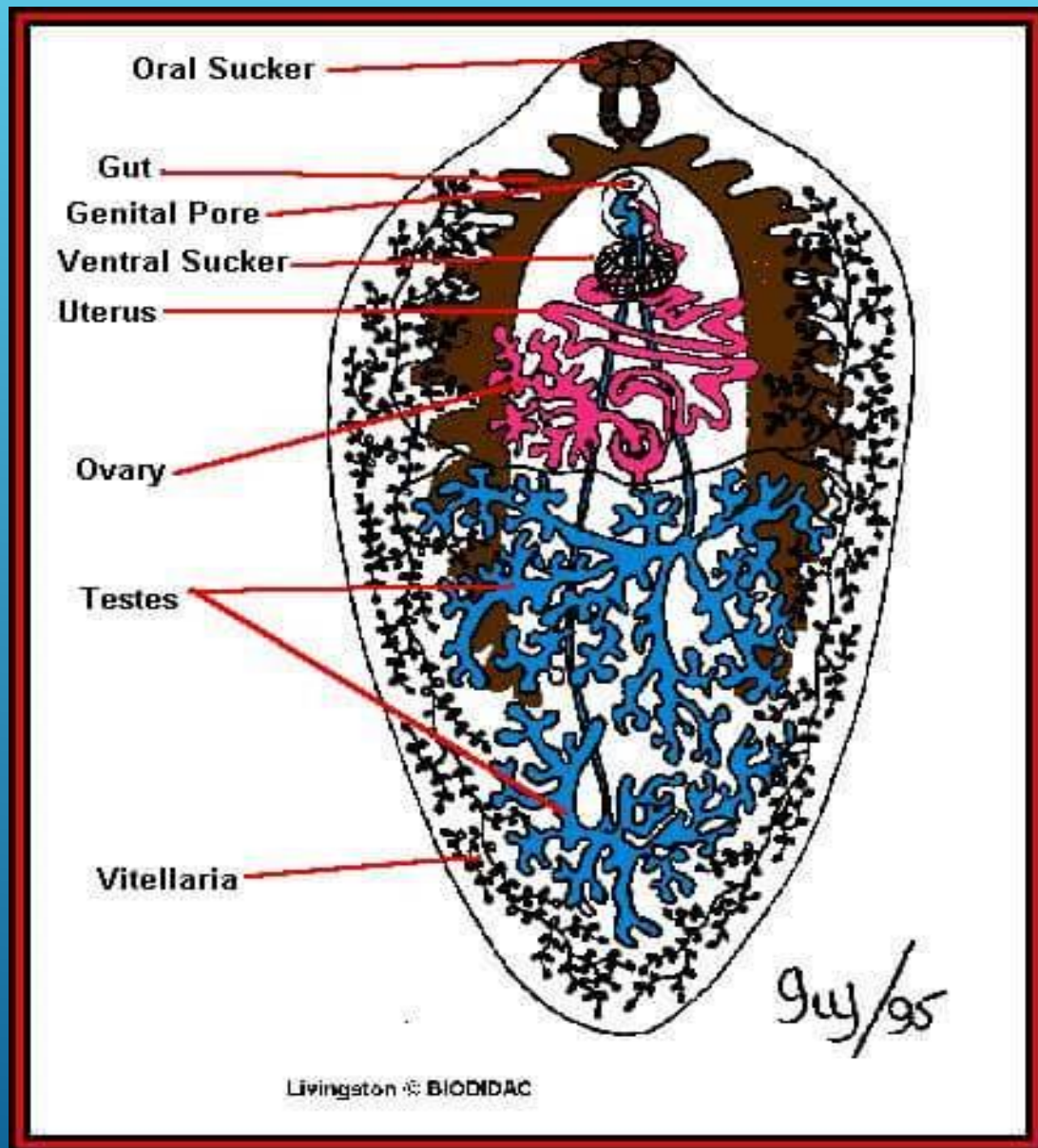


# GIT PARA IN PICTURES

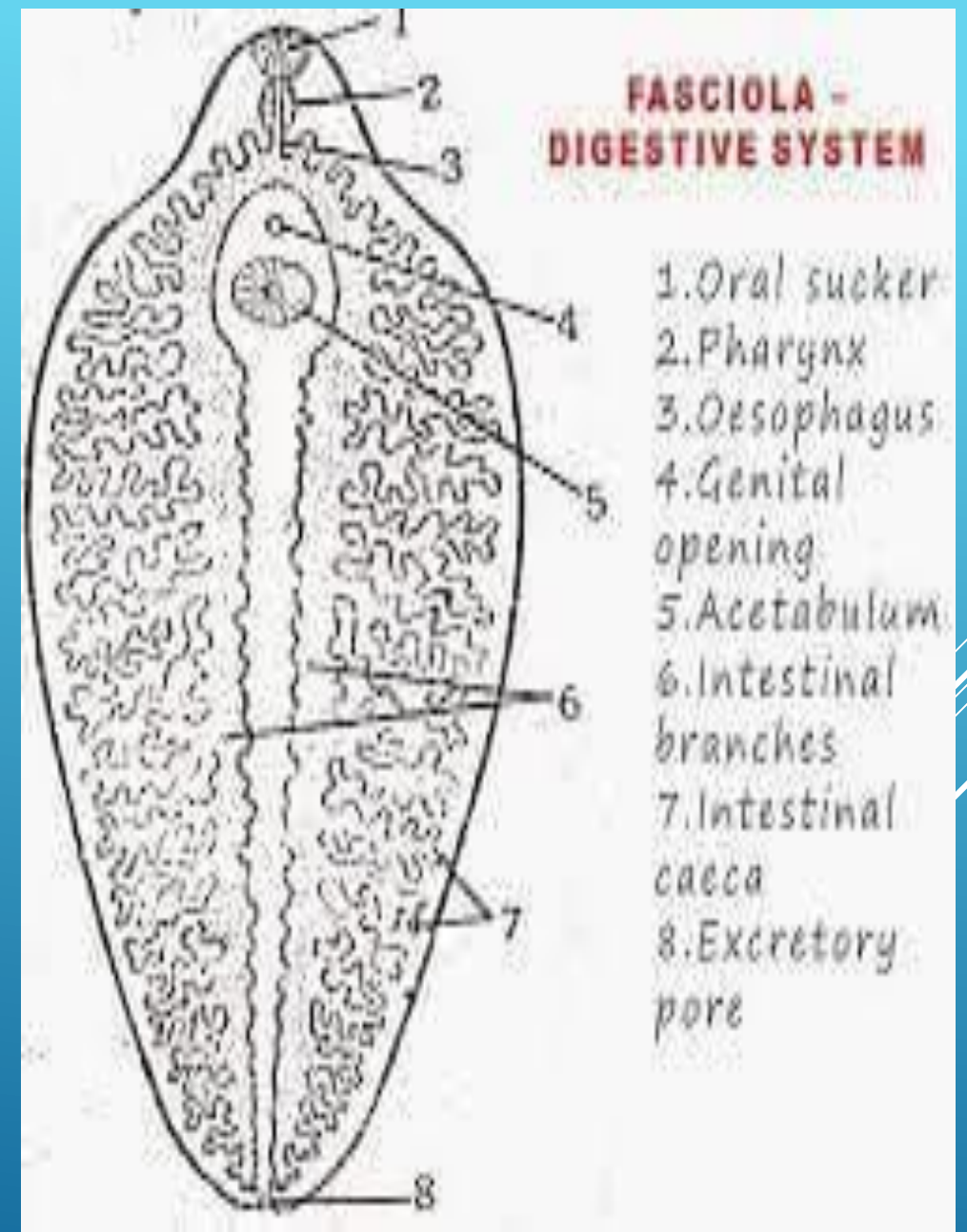
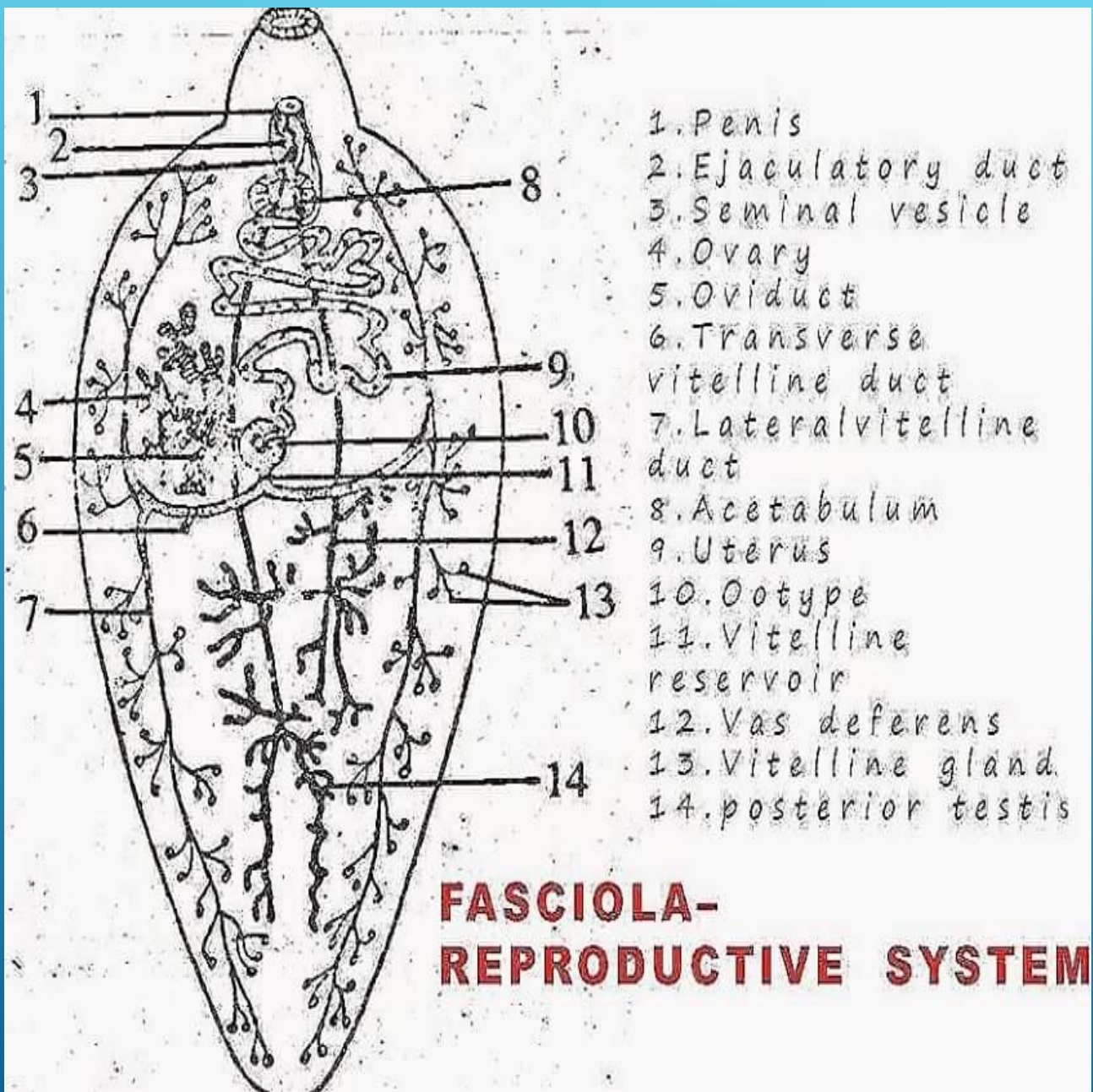
BY: ALI MAHMOUD

# FASCIOLA HEPATICA

**\*\*LIVER FLUKES\*\***

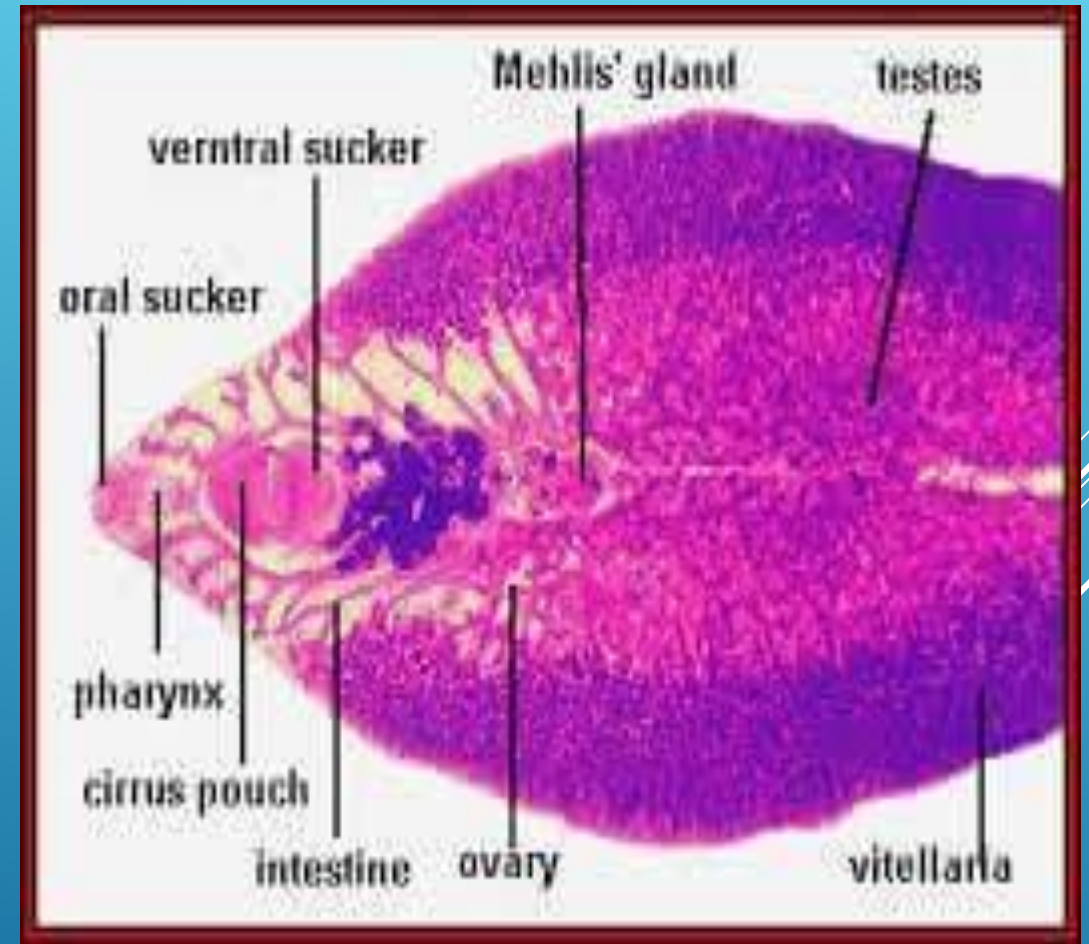
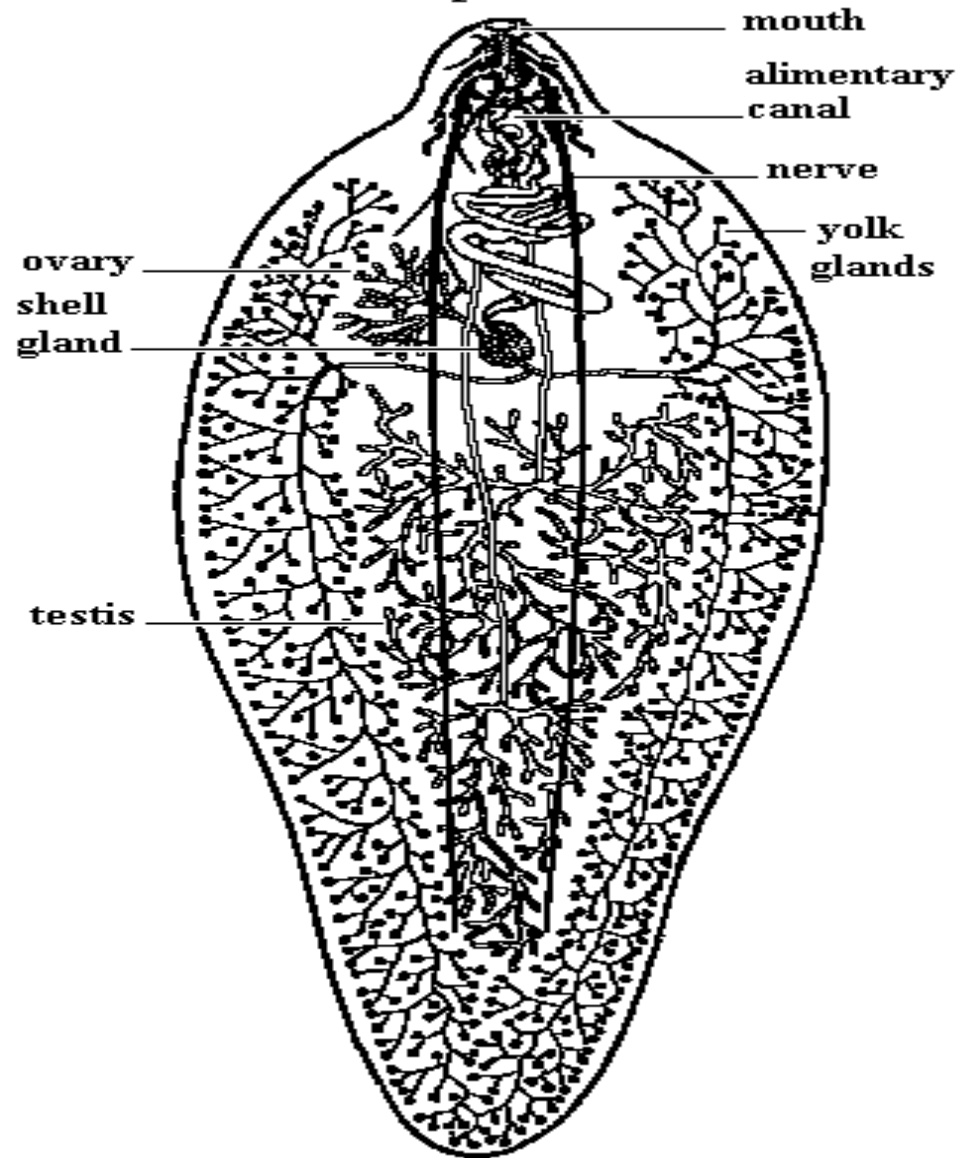


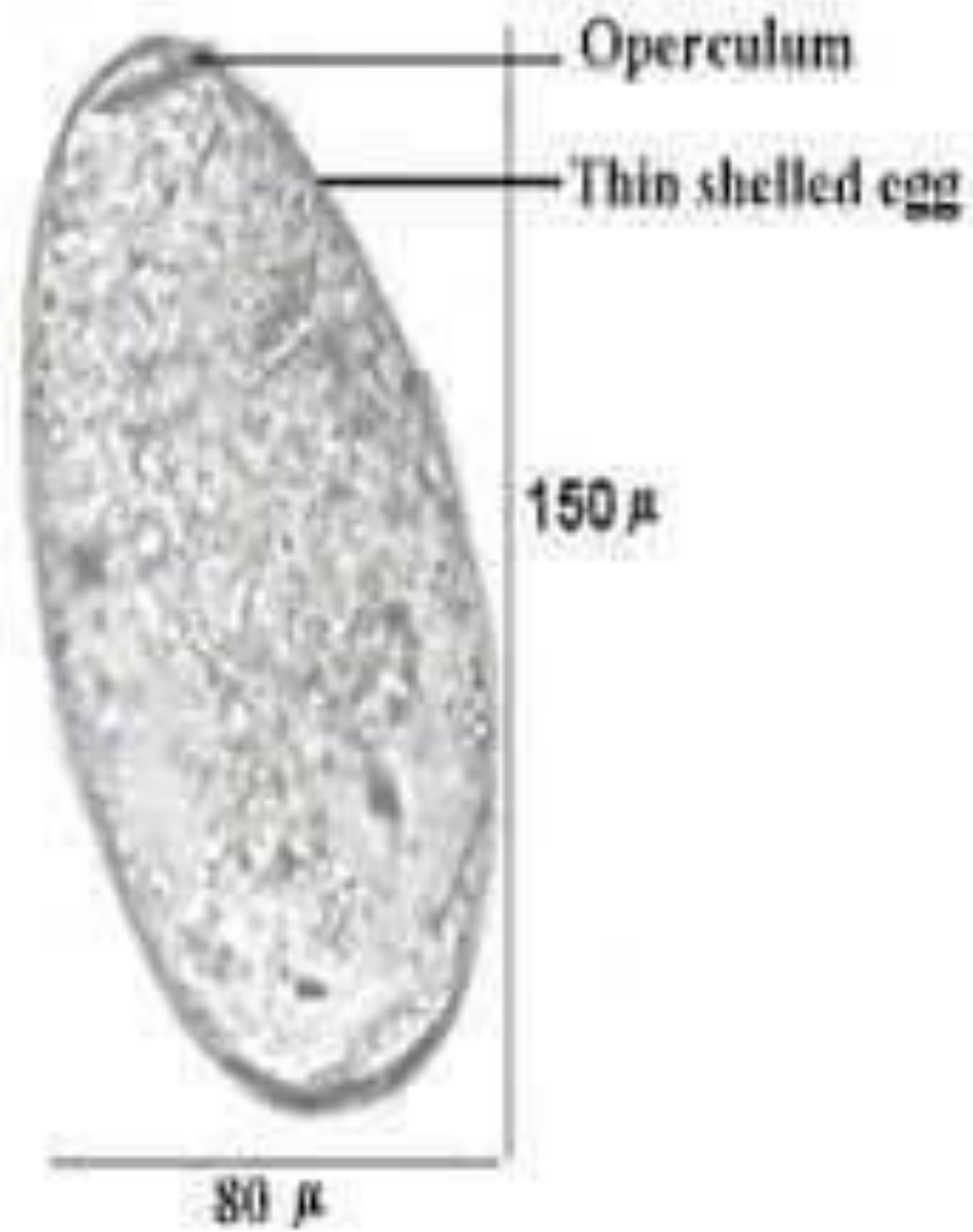






9.37.1 *Fasciola hepatica*



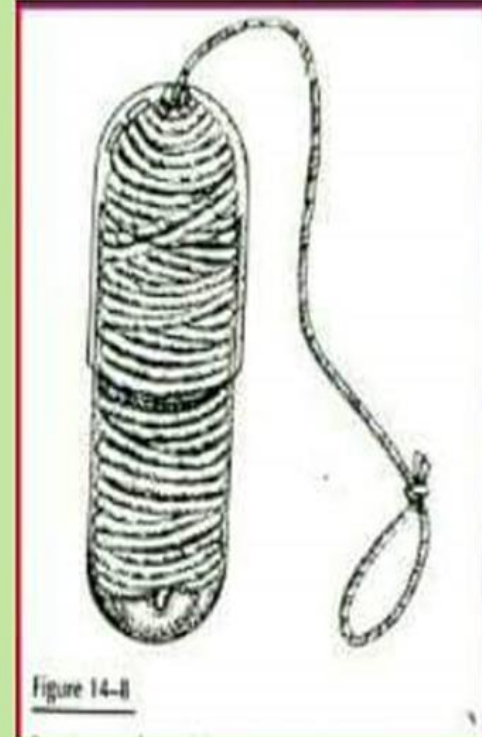
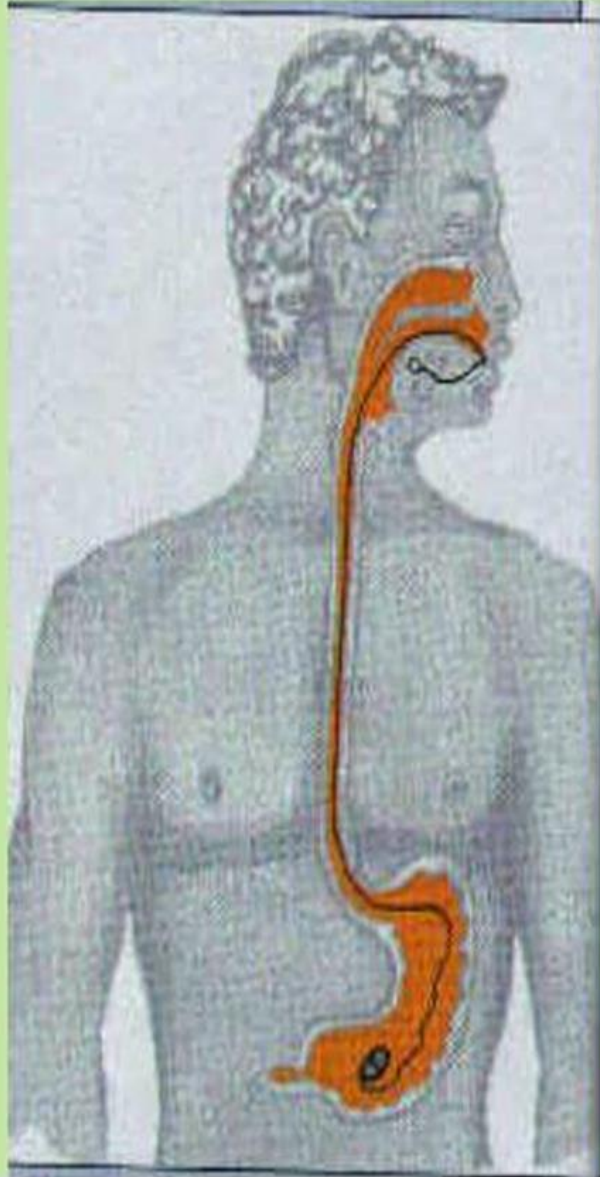




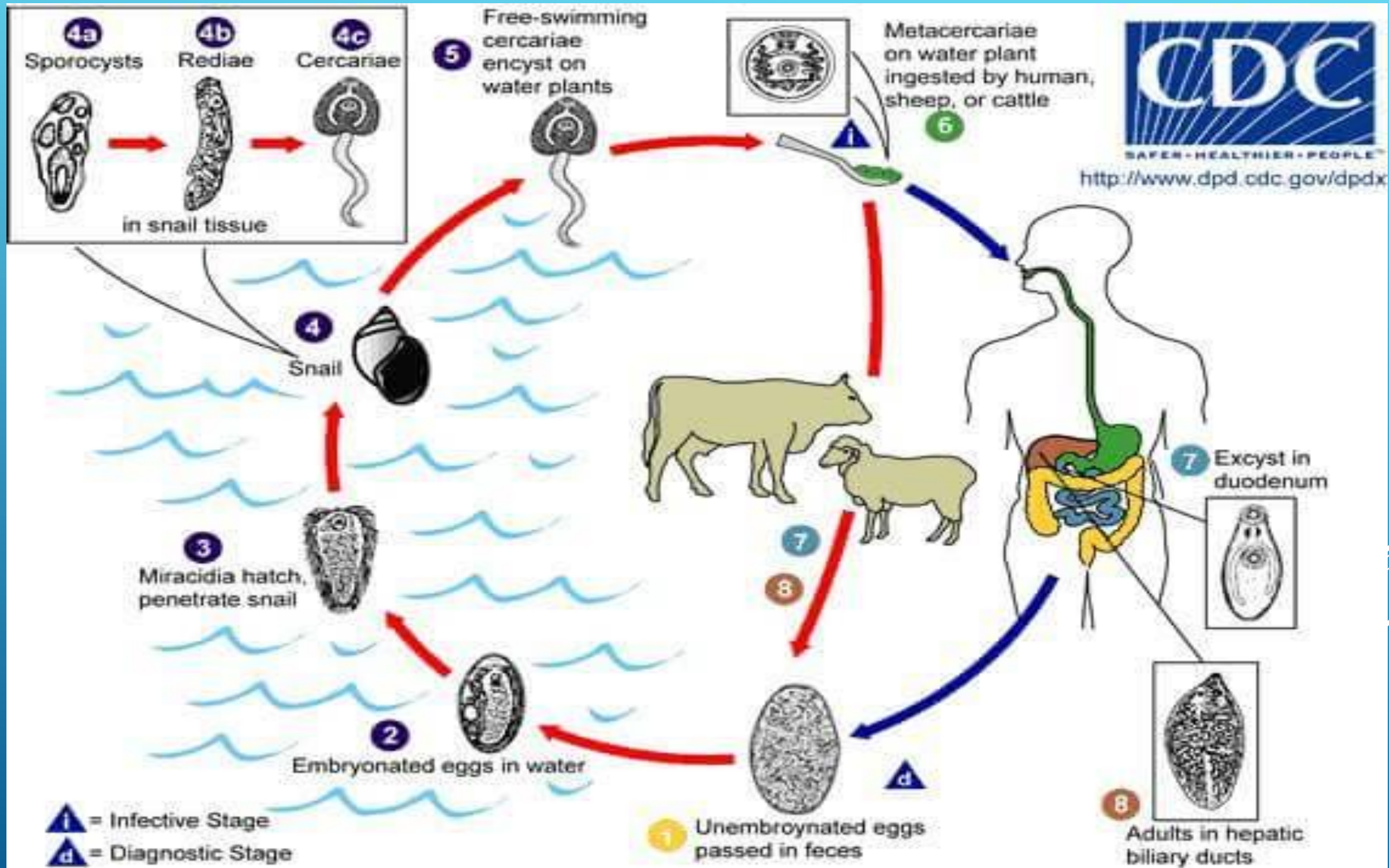
*lymnaea spp*



# Entero Test





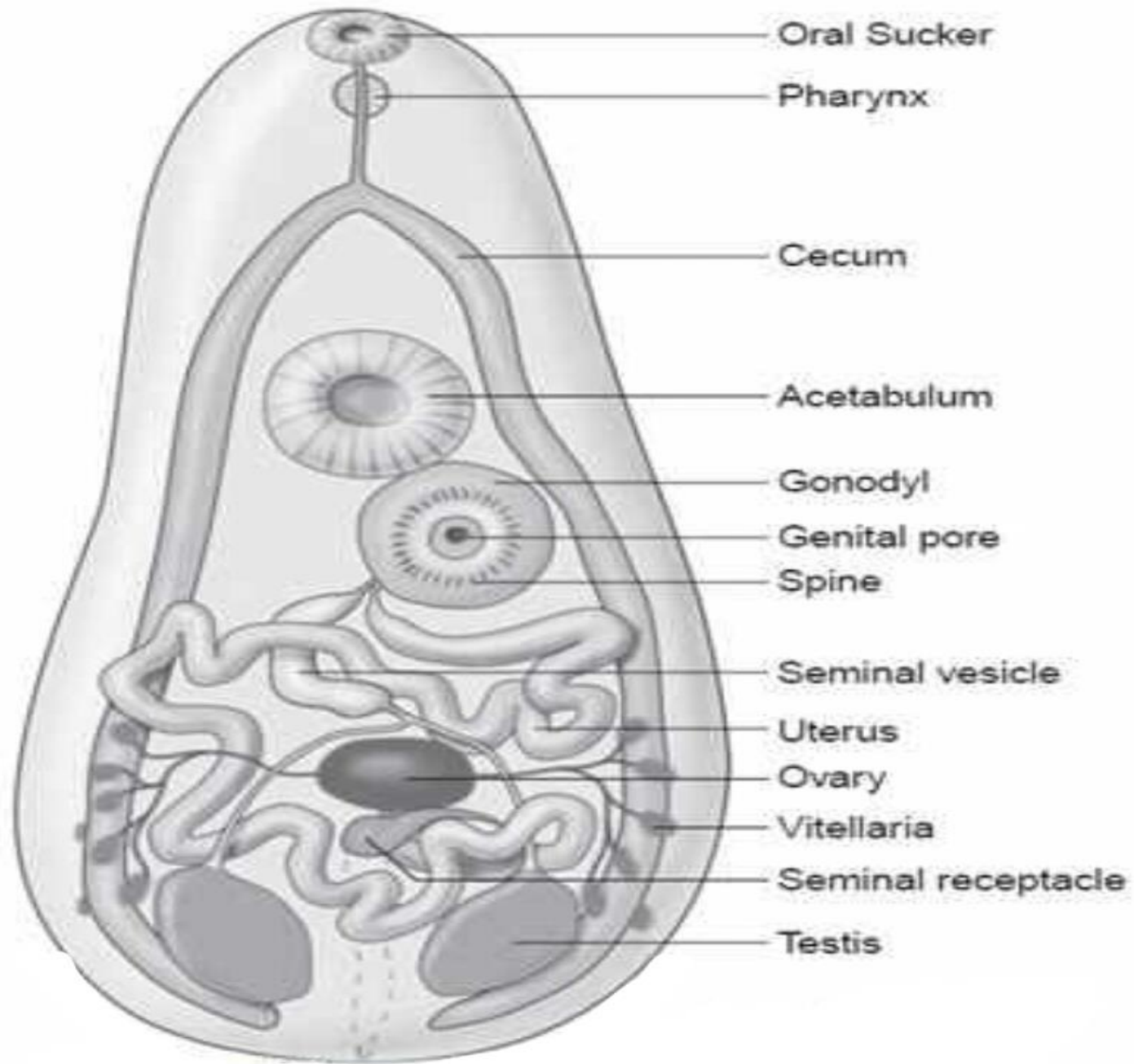


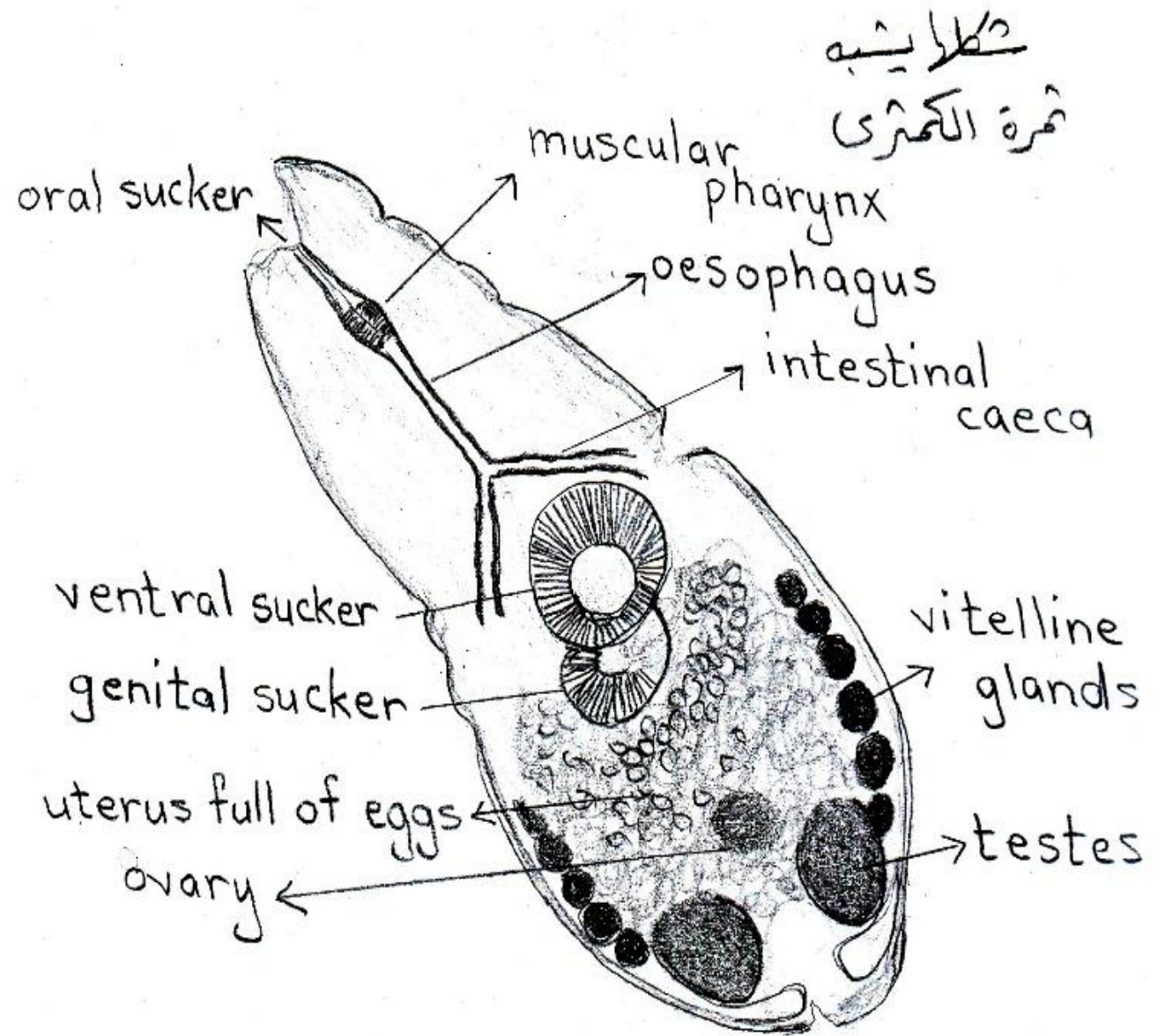
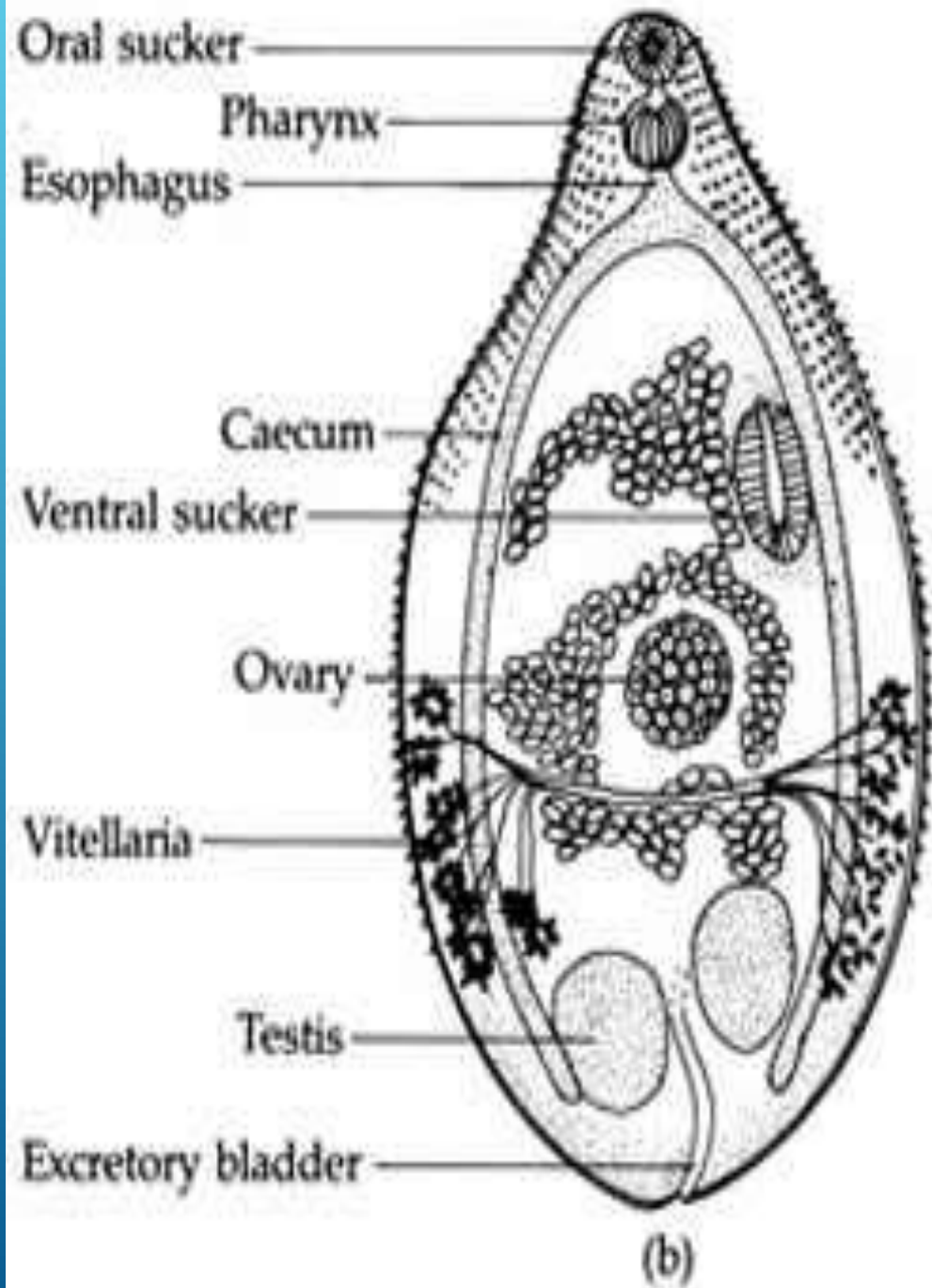
HETEROPHYES

HETEROPHYES

**\*\*INTESTINAL FLUKES\*\***









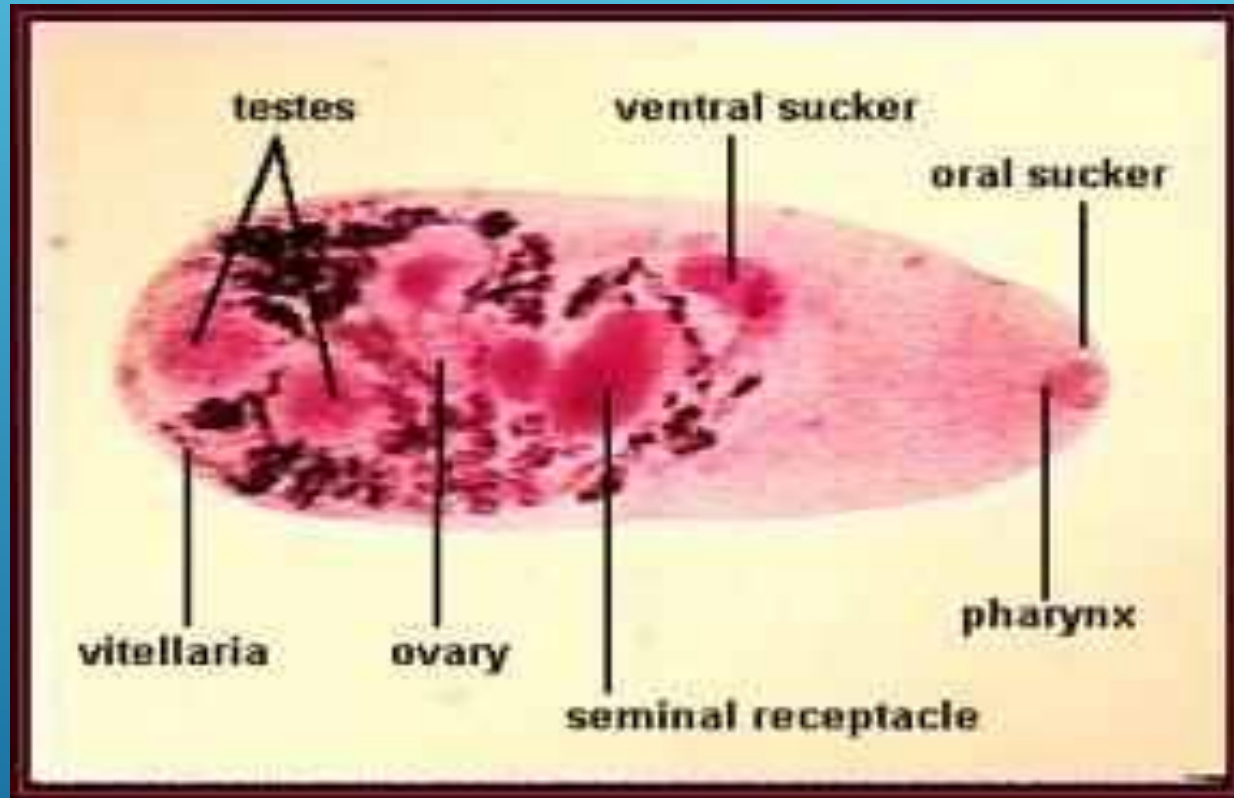
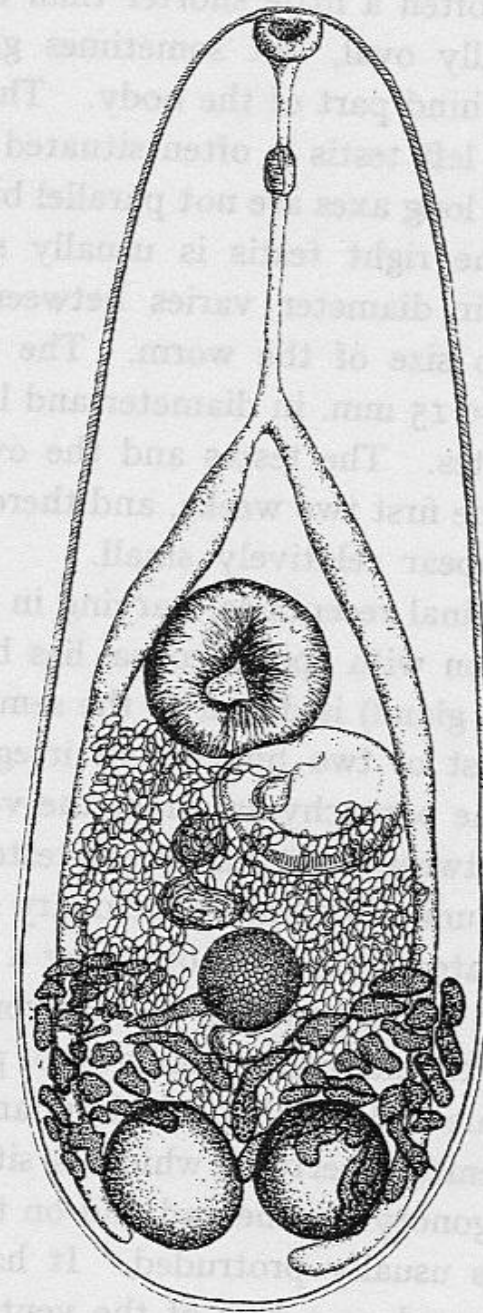
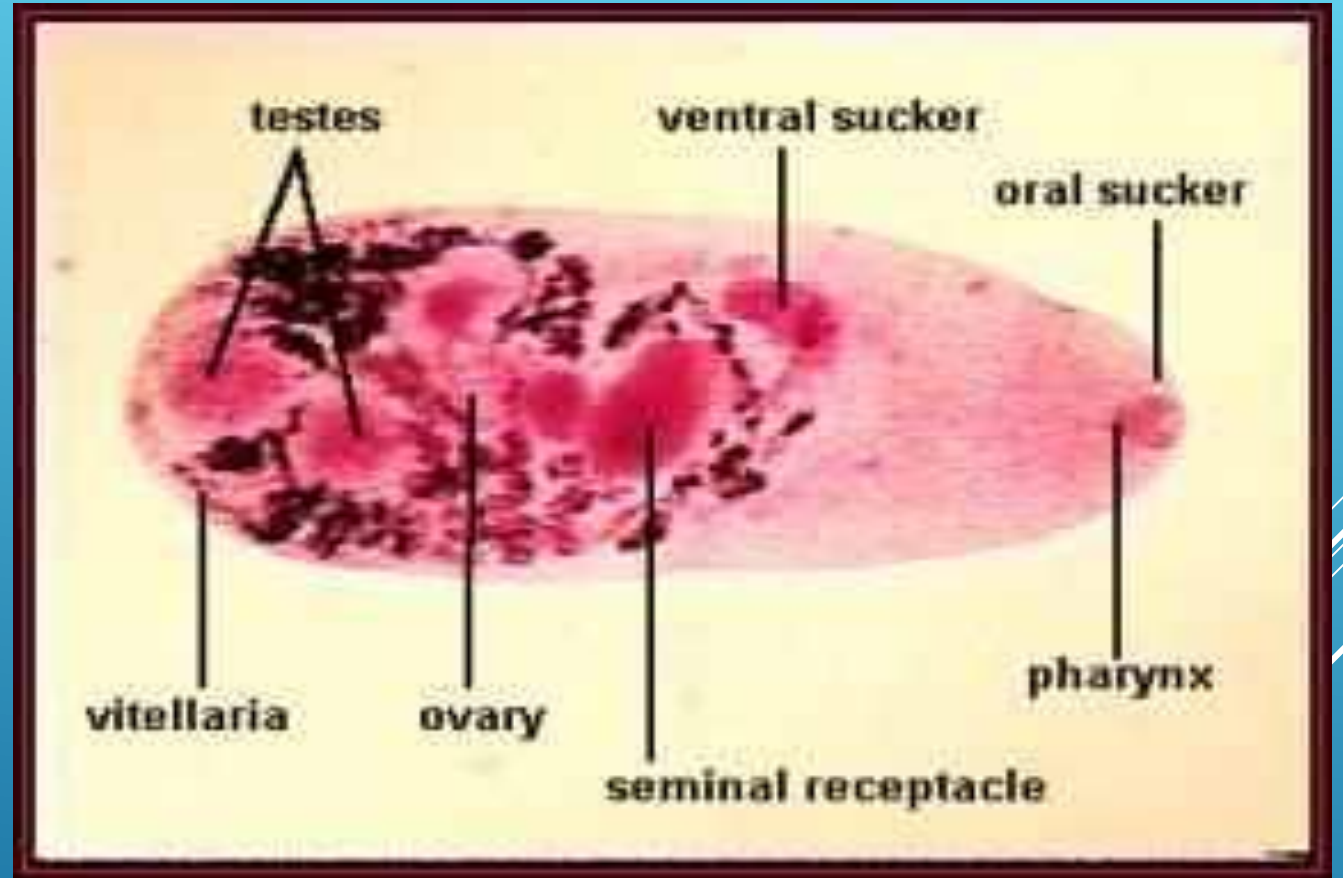
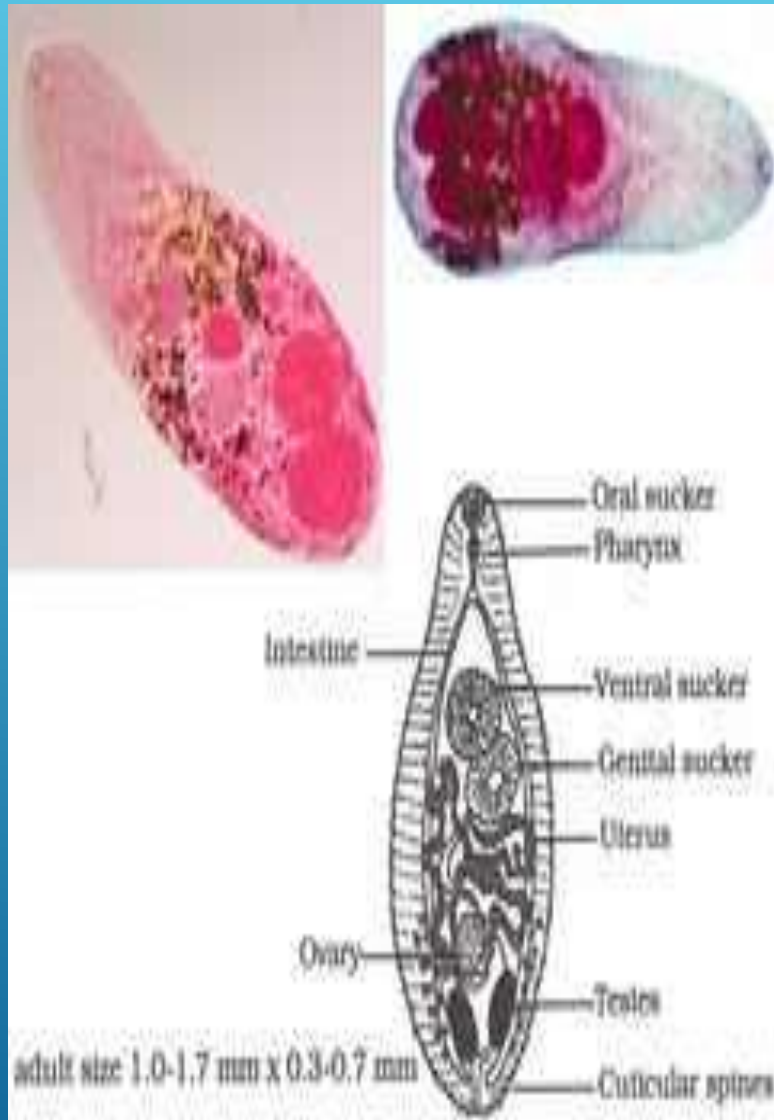
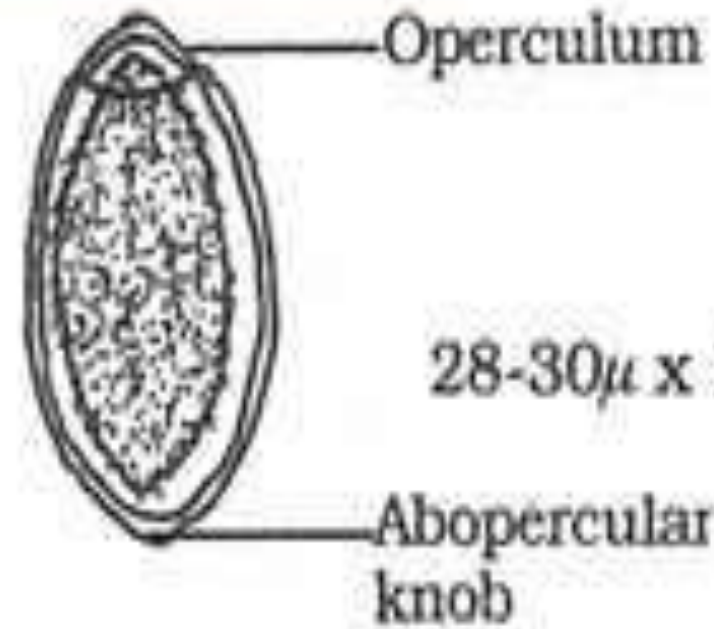
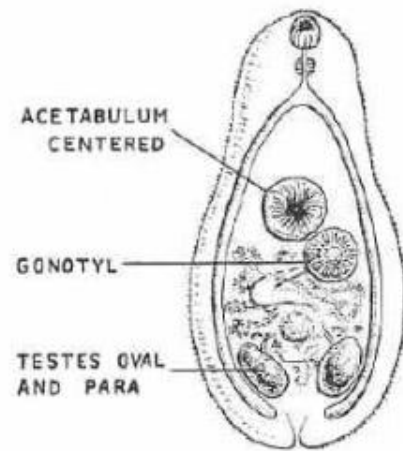
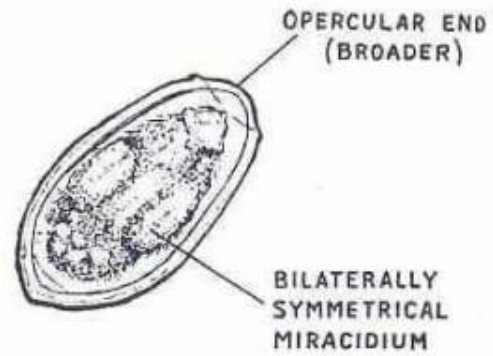


FIG. 6. *Heterophyes heterophyes* from the dog, from a slightly distended specimen (flattened preparation).







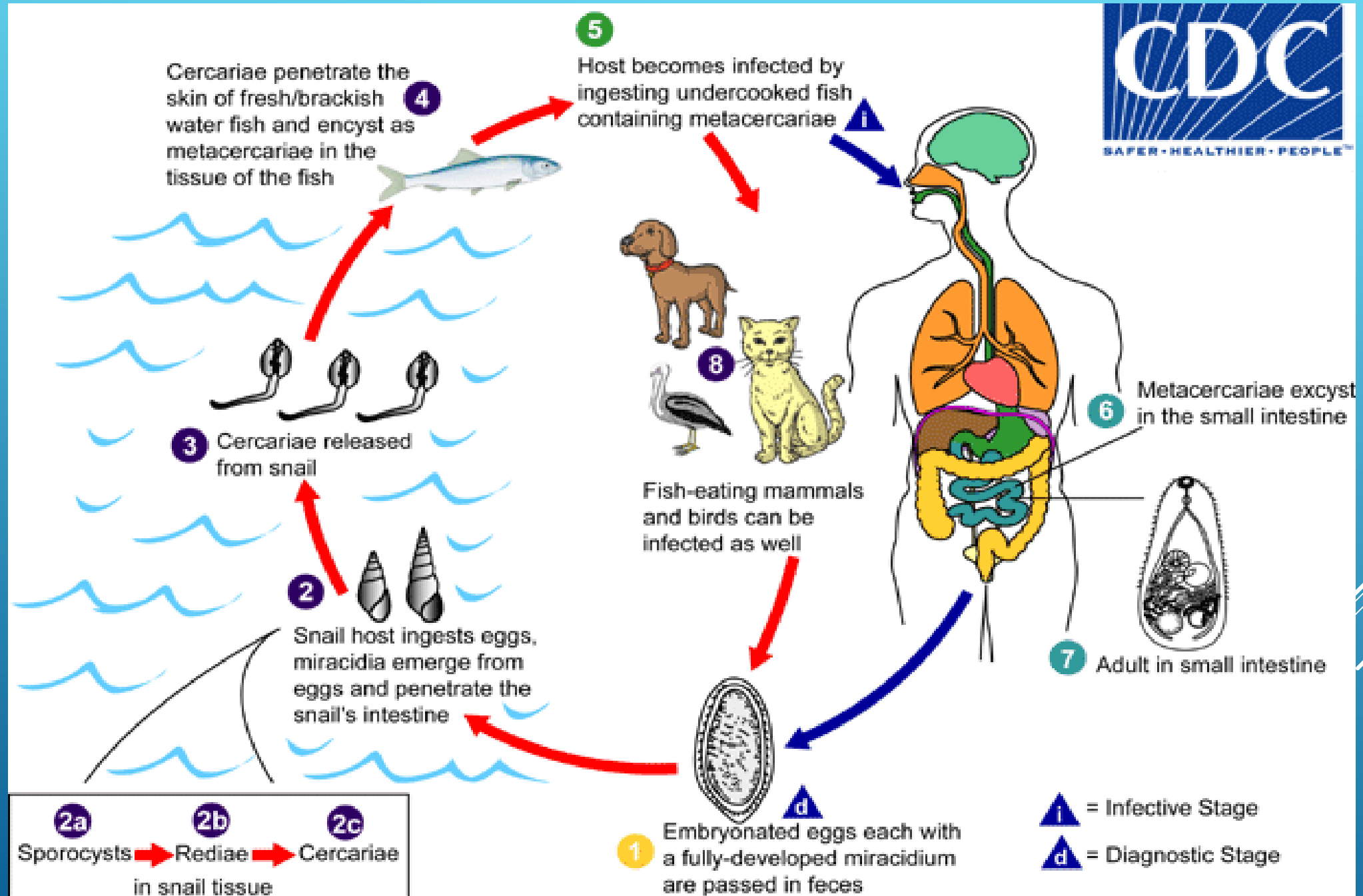


28-30 $\mu$  x 15-17 $\mu$



*Pirenella conica*

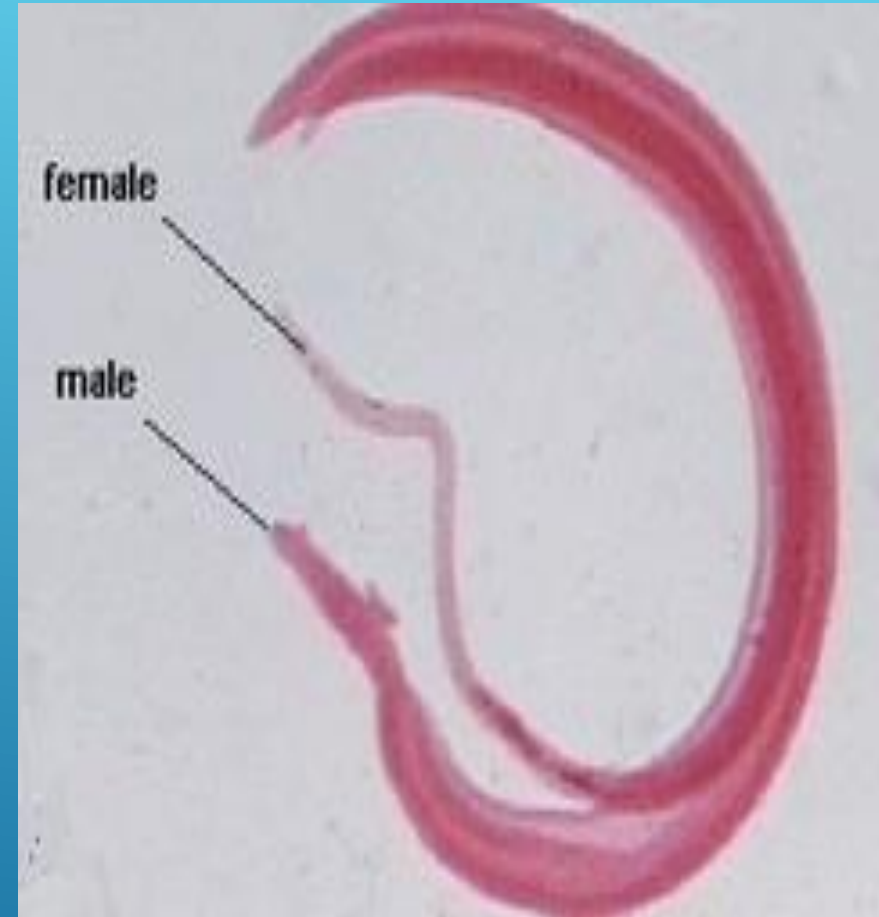
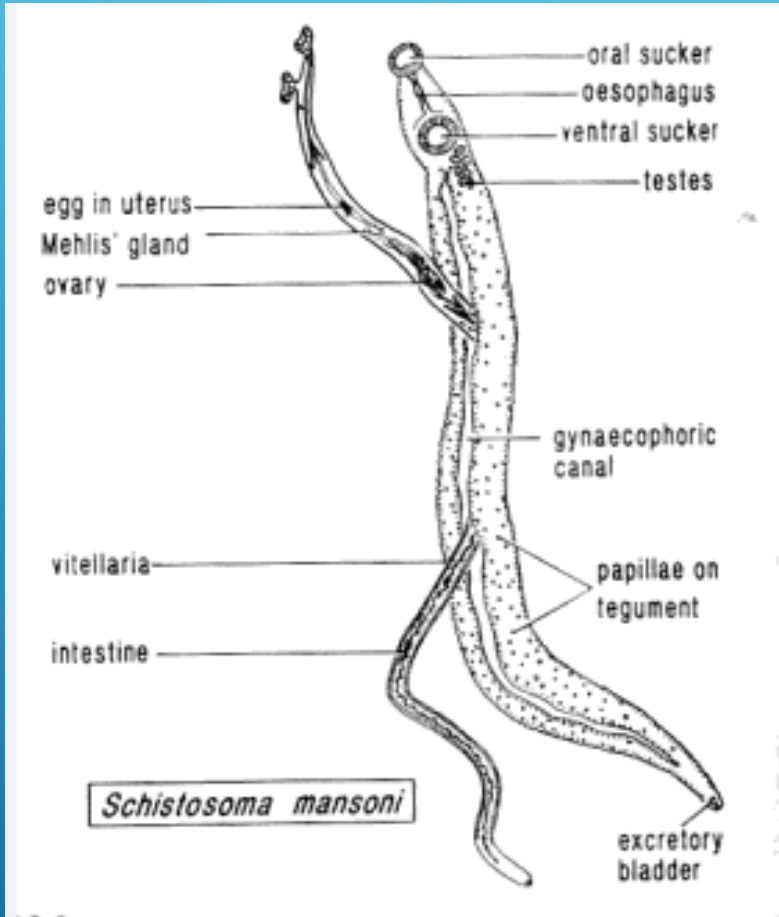




# S. MANSONI

**\*\*BLOOD FLUKE\*\***







**FIGURE 11-4** Scanning electron micrograph of *Schistosoma mansoni* adult worms in copula.



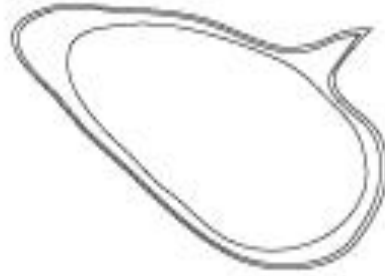
**FIGURE 11-3** Scanning electron micrograph of adult male schistosome showing mouth and ventral sucker. Note female worm in gynaecophoric canal. Source: National Cancer Institute.

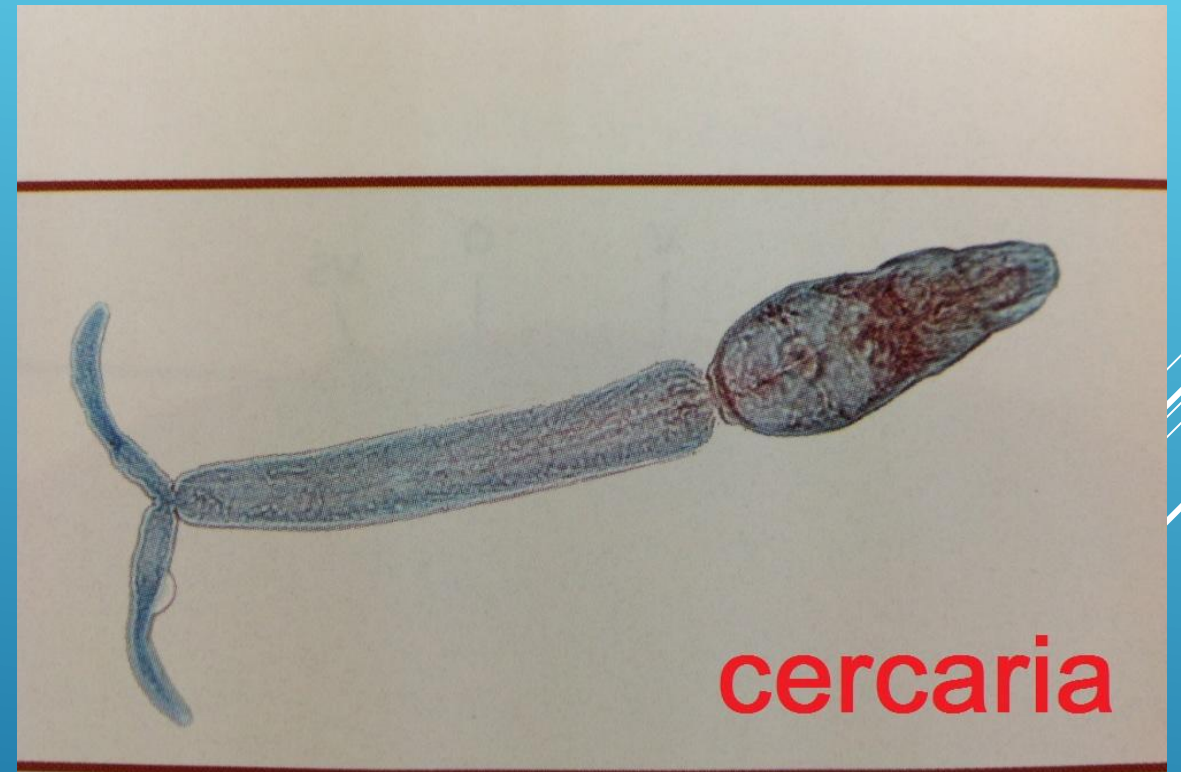
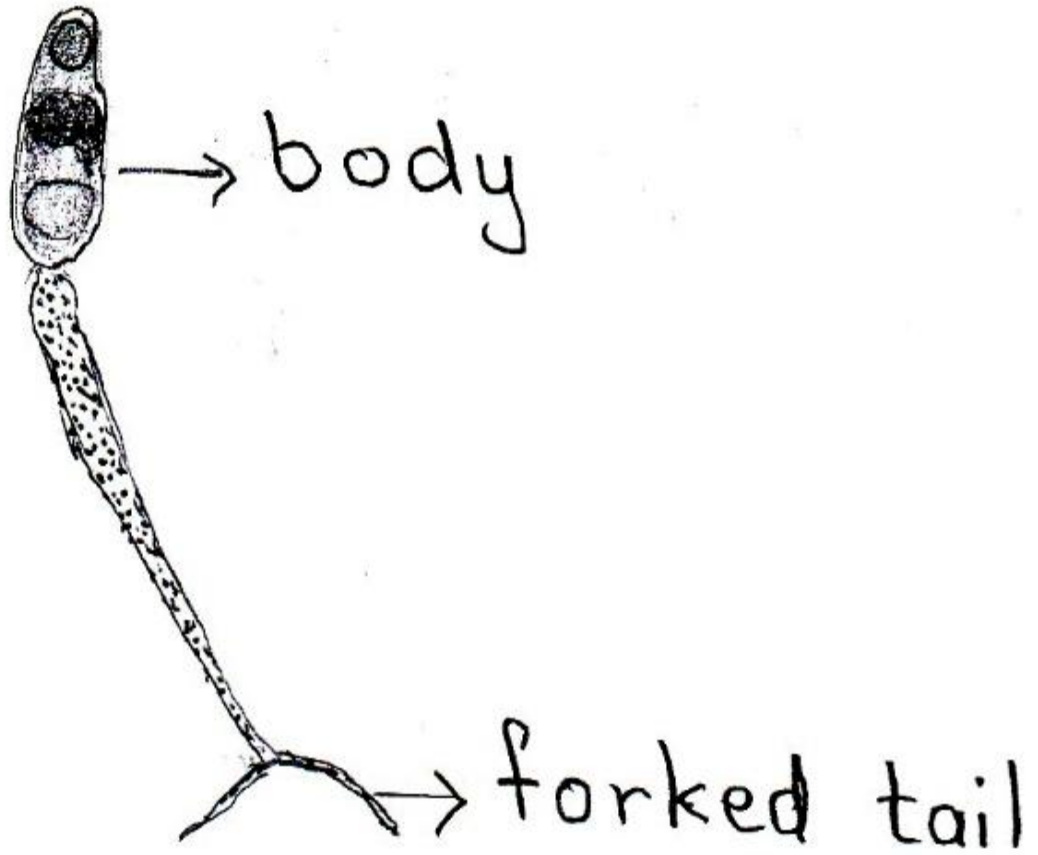


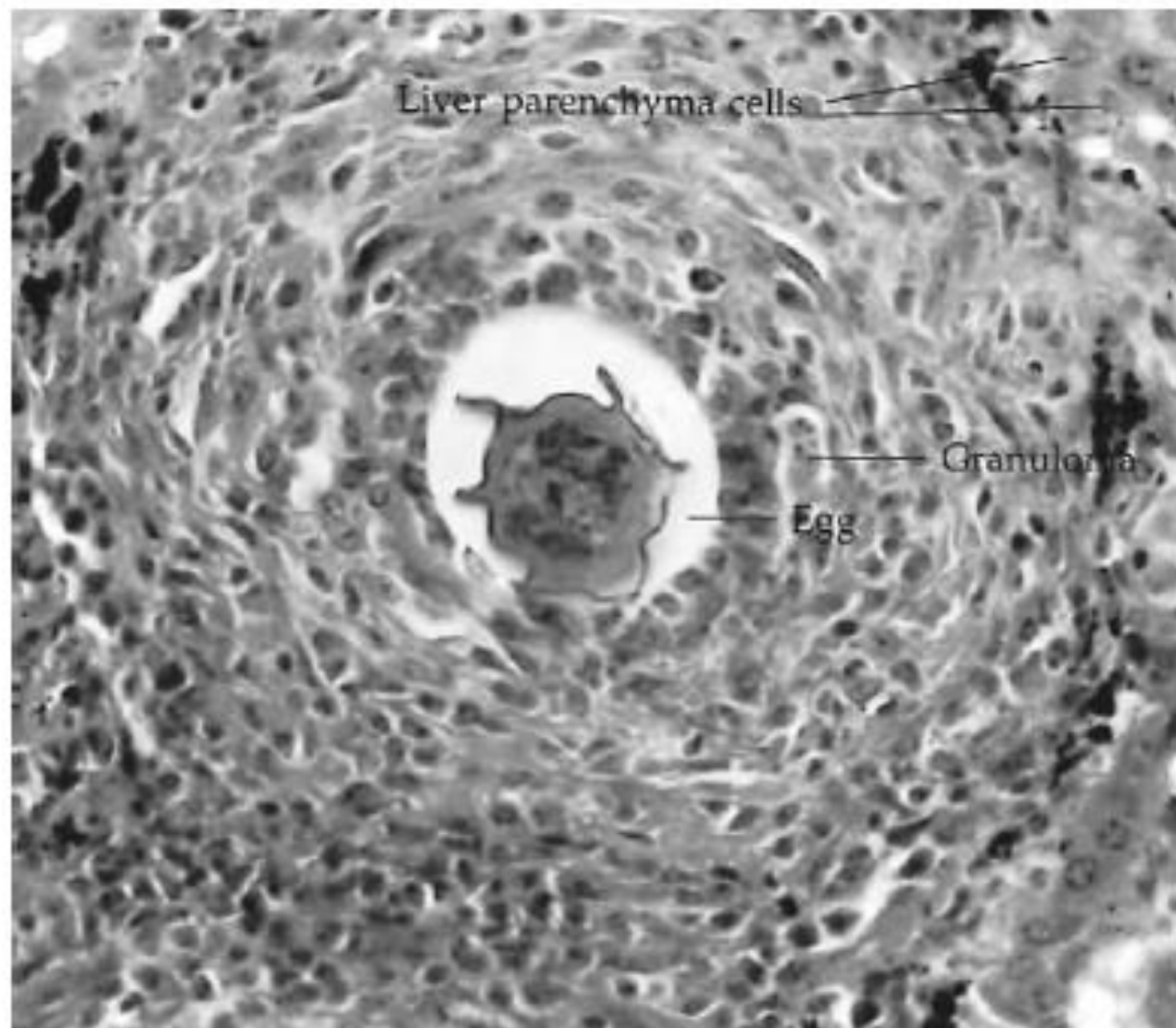
**Lateral spine**

**Transparent shell**

**Miracidium**



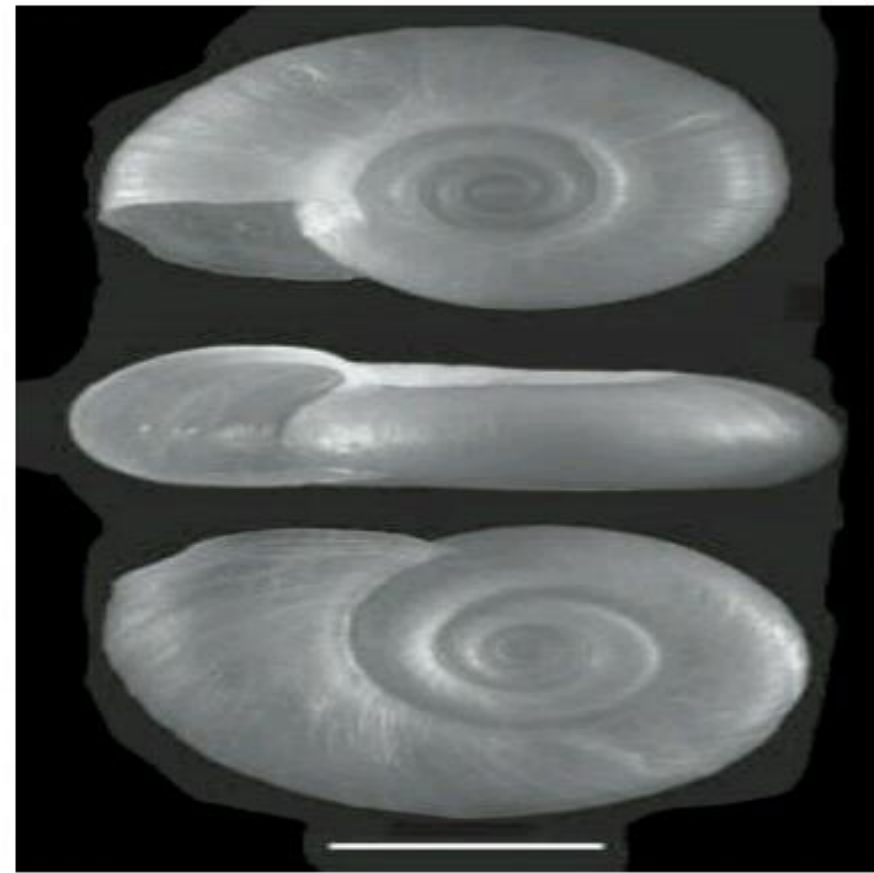




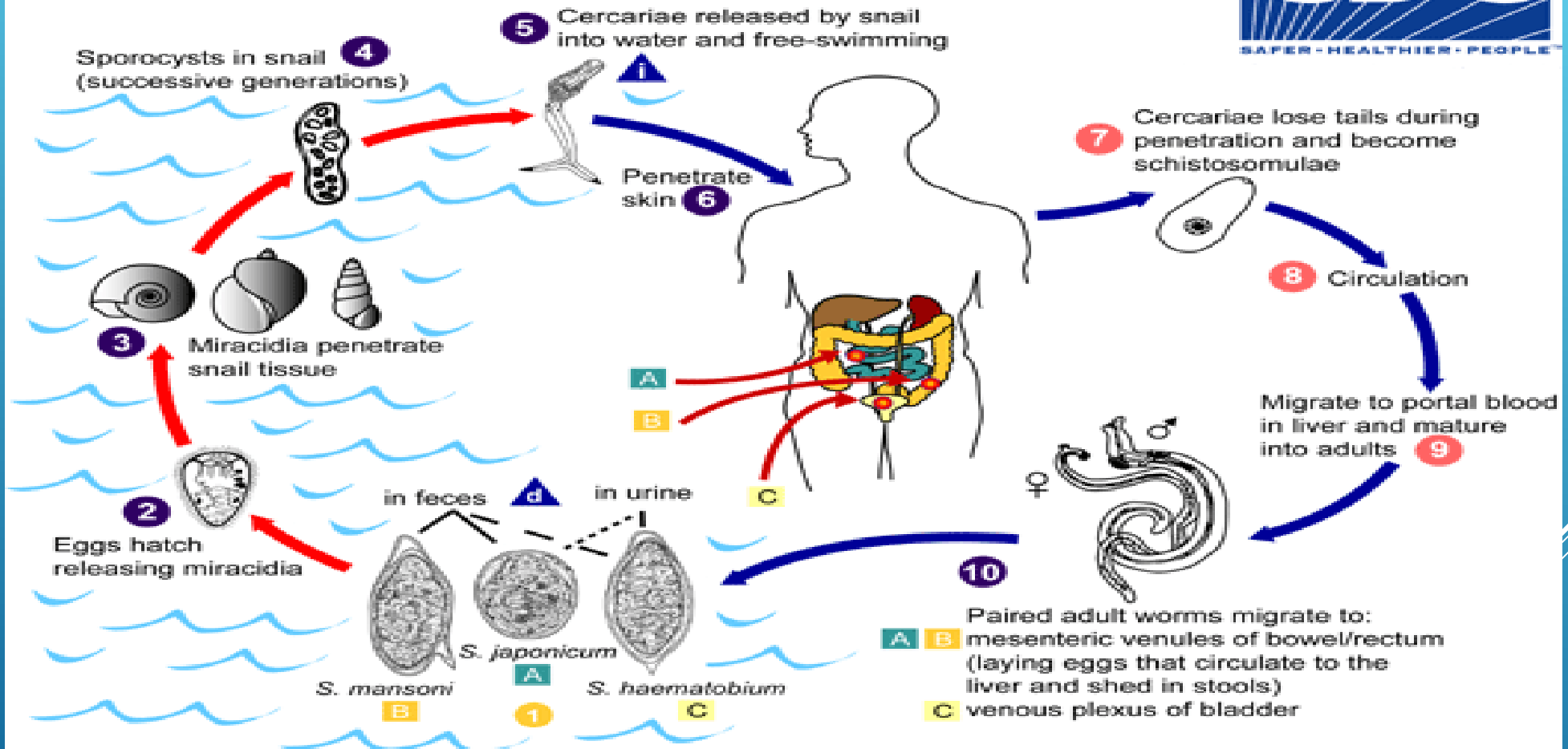
*Schistosoma mansoni* egg in liver granuloma.

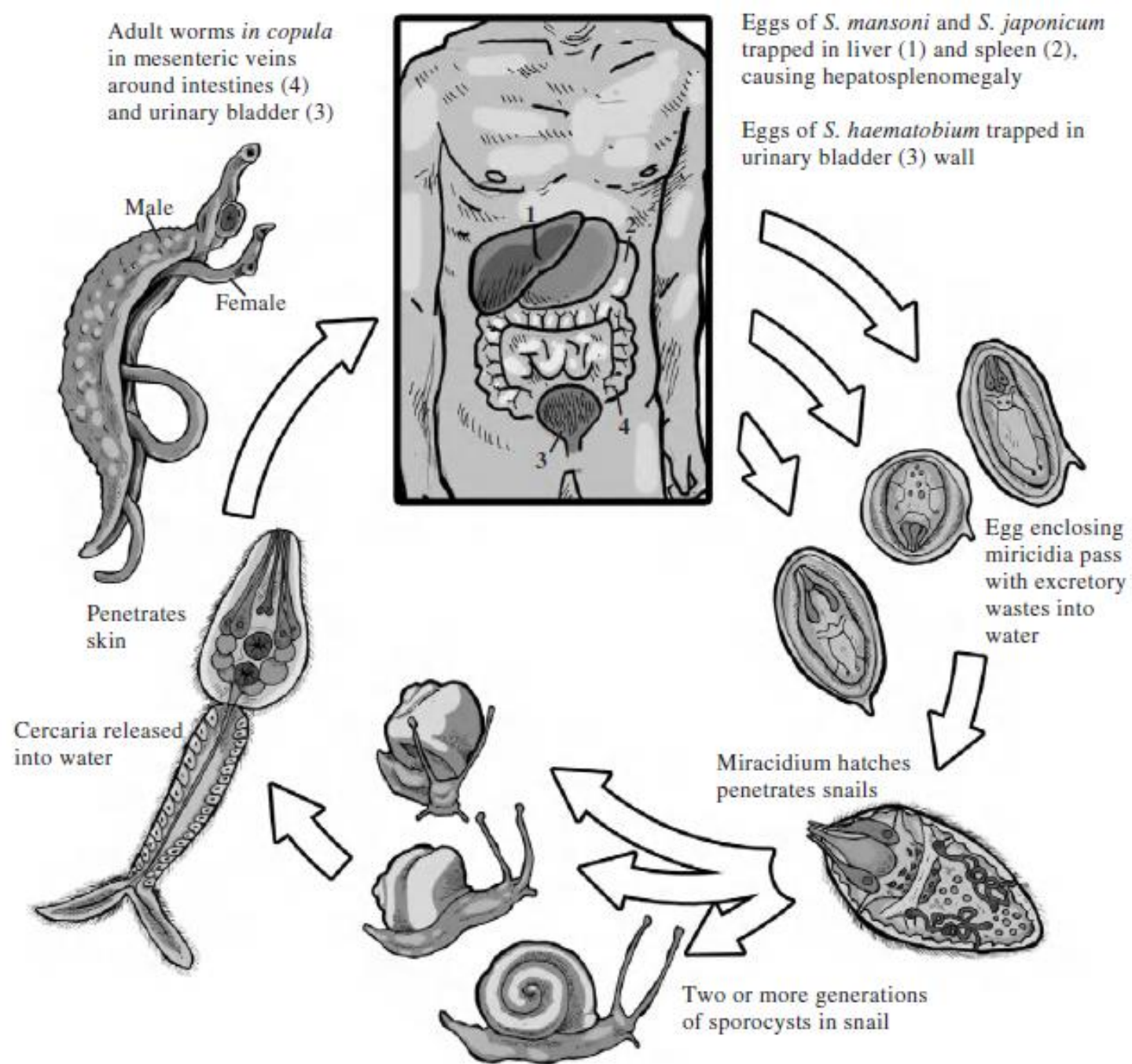


*biomphalaria alexandrina* snail



**i** = Infective Stage  
**d** = Diagnostic Stage





**FIGURE 11-5** Life cycles of *Schistosoma* spp. Credit: Image courtesy of Gino Barzizza.



DON'T  
GIVE  
UP!

CESTODES

# IMPORTANT....

- **Diphyllobothrium Latum =**  
**the broad or fish tapeworm**
- **Taenia Saginata = Beef tapeworm**
- **Taenia Solium = Pork tapeworm**
- **Hymenolepis Nana =**  
**the dwarf tapeworm**



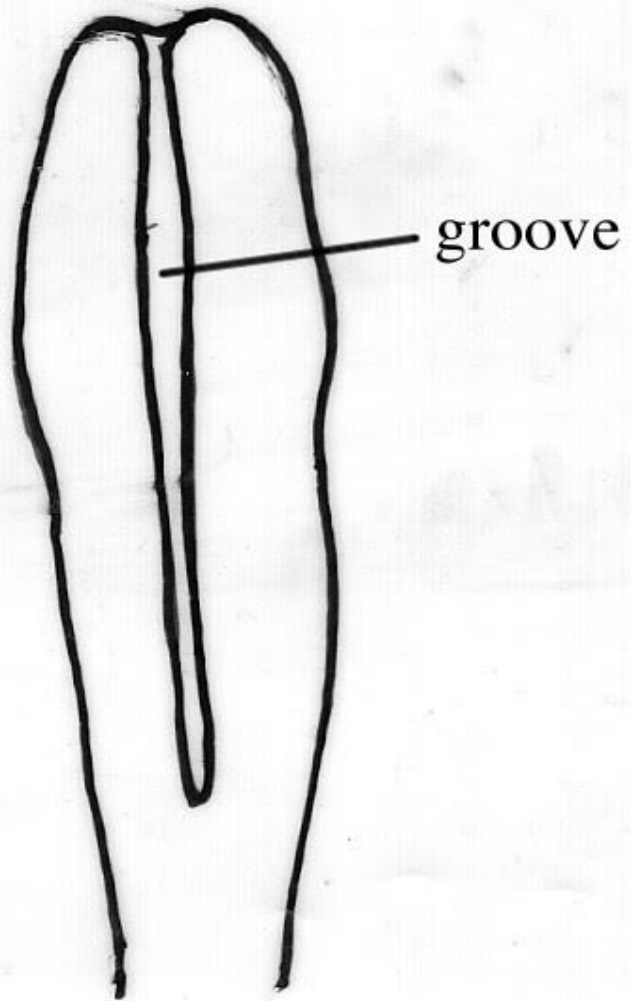
# CESTODES

## Pseudophyllidean Tapeworms

- **Diphyllobothrium  
latum**

## Cyclophyllidean Tapeworms

- **Taenia Saginata**
- **Taenia Solium**
- **Hymenolepis Nana**



Scolex of diphylobothrium latum

*Diphylobothrium latum*

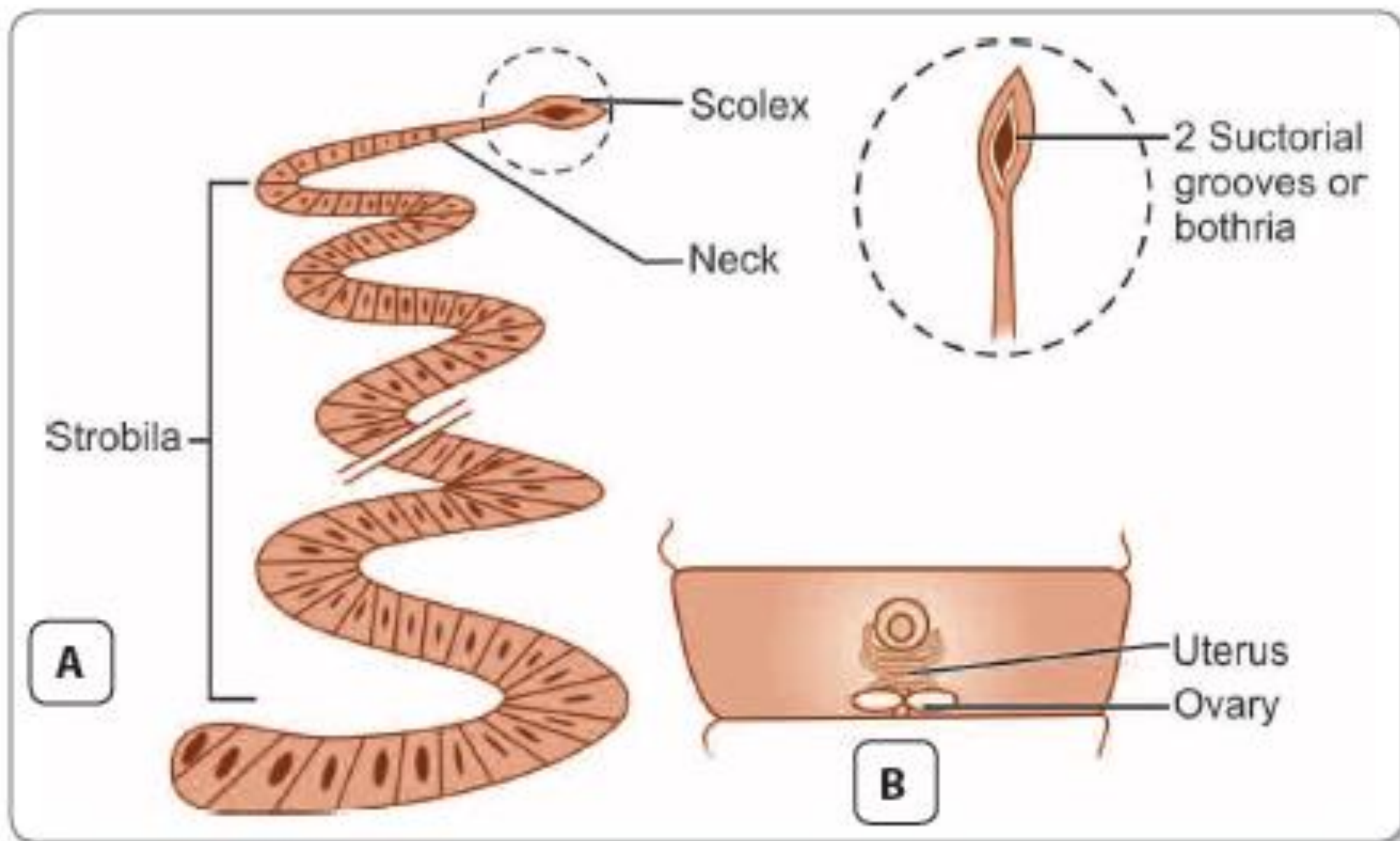
Scolex

Peter Darben

0.1mm

Gravid Proglottid

2mm



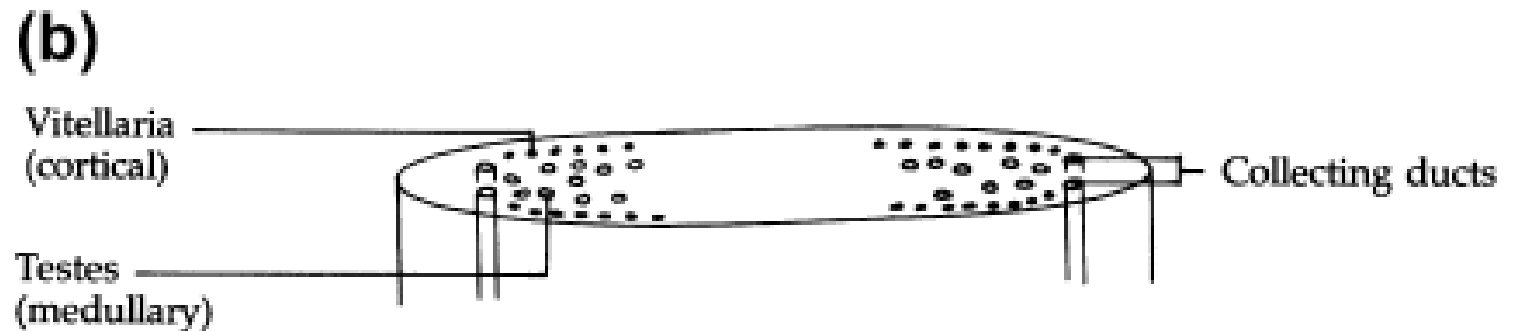
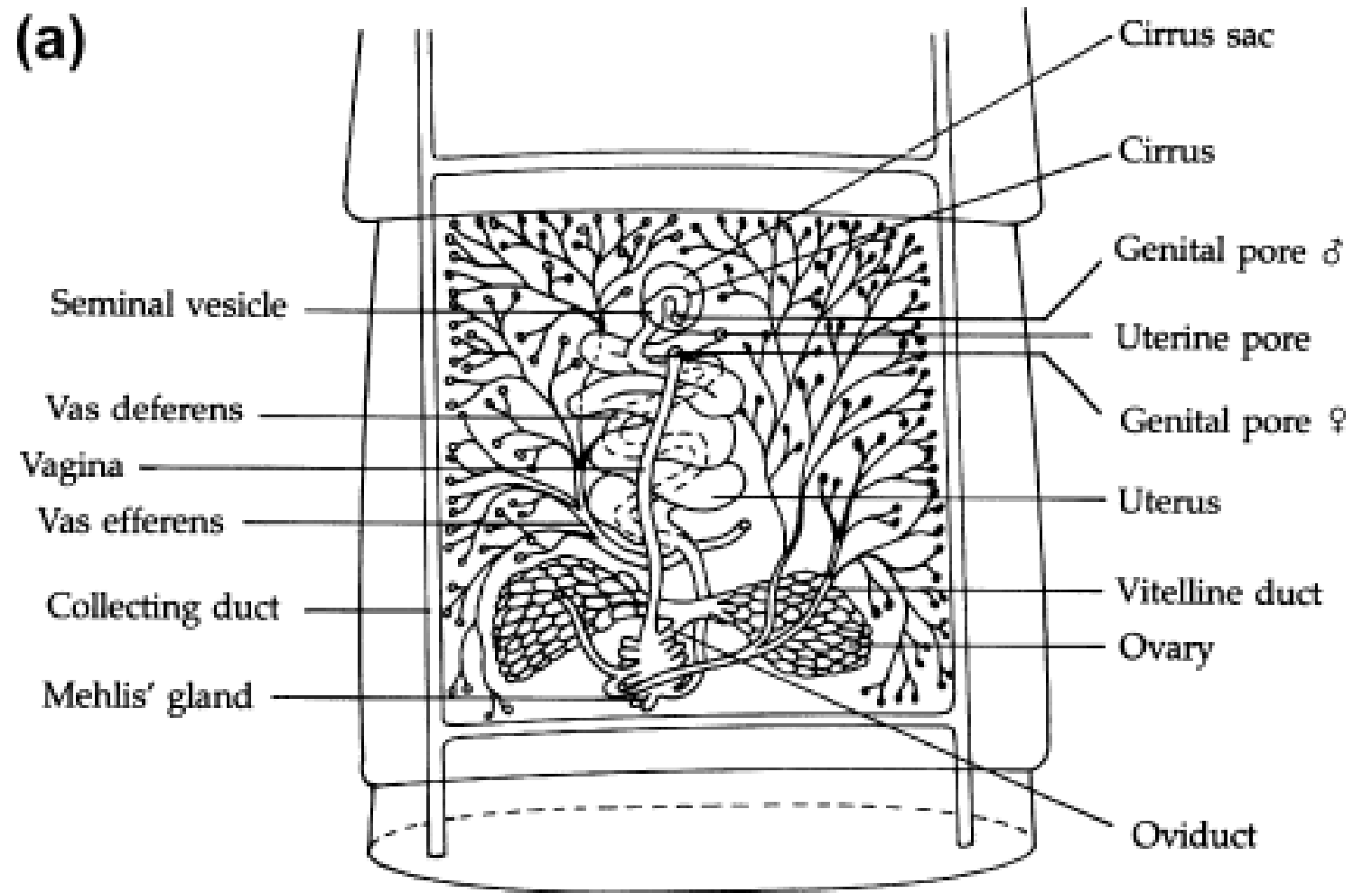
**Fig. 12.3:** *Diphyllobothrium latum* **A.** Adult worm showing spatulate scolex, neck, and strobila **B.** Mature proglottid

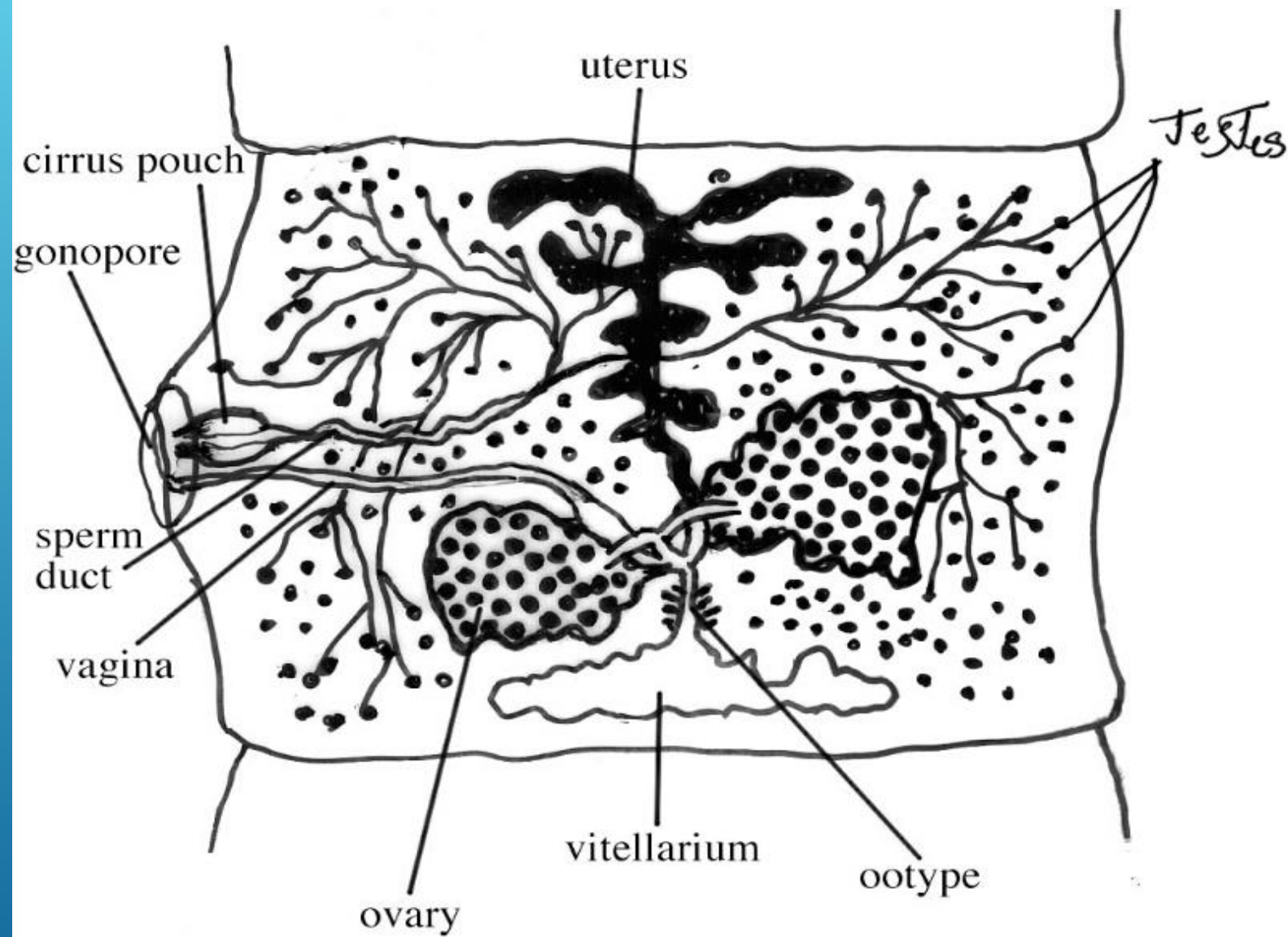


**FIGURE 13-1** Mature proglottid of *Diphyllobothrium latum*.

(a) Ventral view.

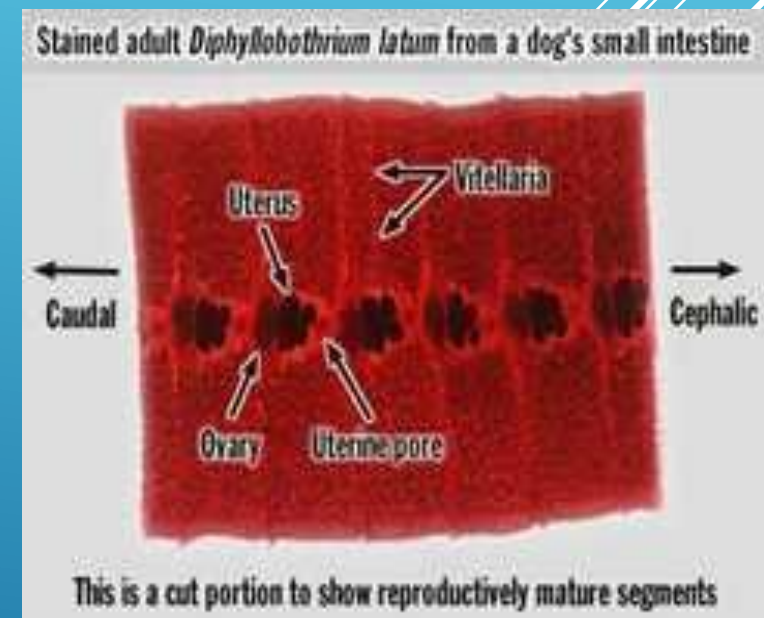
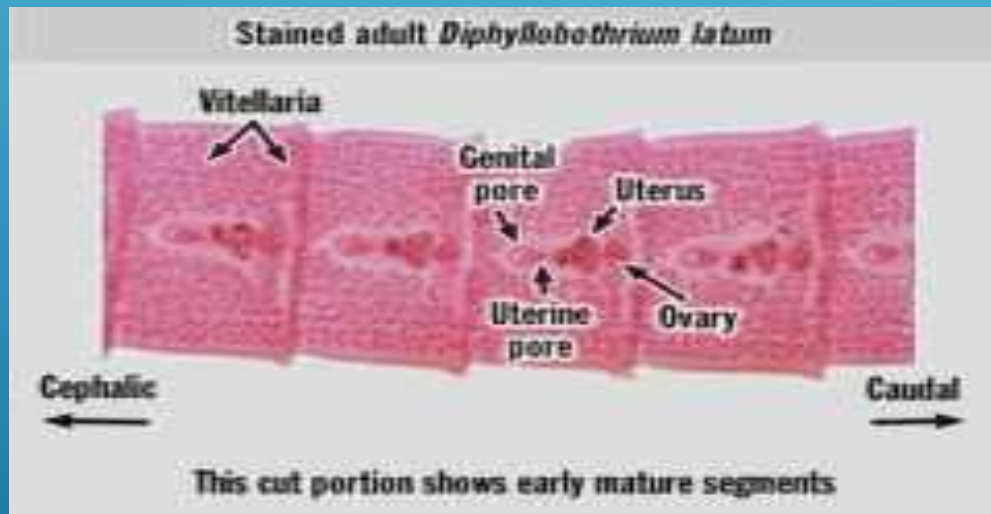
(b) Cross section.



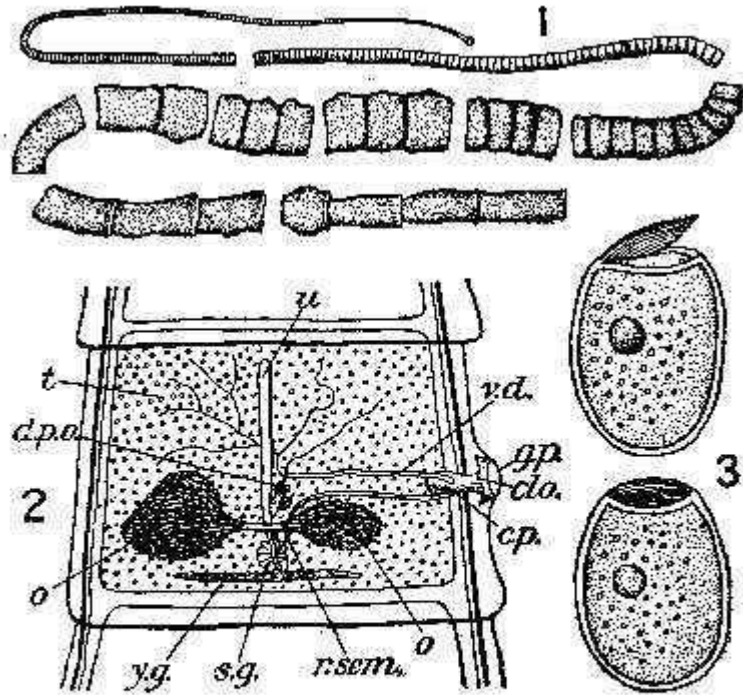


**mature segment of diphylobothrium latum**

# ده المنظر تحت الميكروسكوب

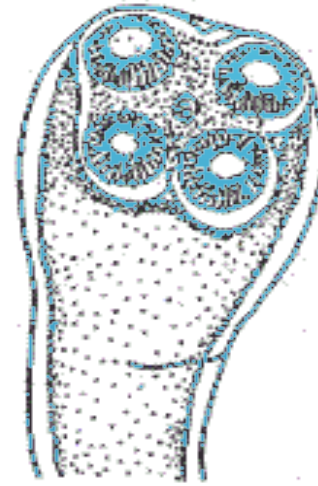




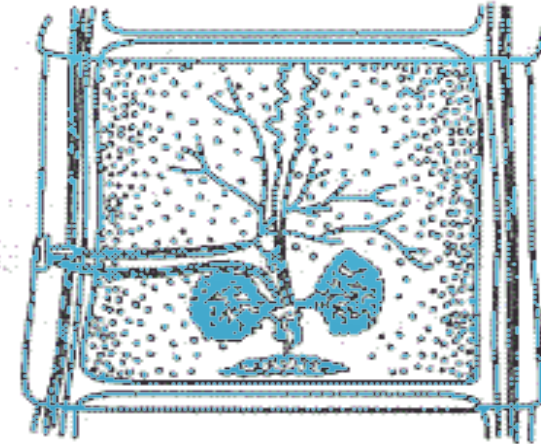


#### TAPEWORMS.

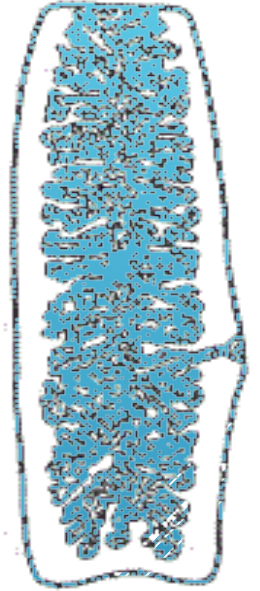
1, *Taenia saginata*; 2, segment of *Taenia solium* (showing generative organs): u, uterus; t, testes; o, ovary; d.p.o., detached portions of ovary; y.g., yolk gland; s.g., shell gland; r.sem., receptaculum seminis; v.d., vas deferens; gp, genital papilla; clo., clonca; cp., cirrus pouch; 3, hitted ova of *Bothriocephalus latus*.



Scolex

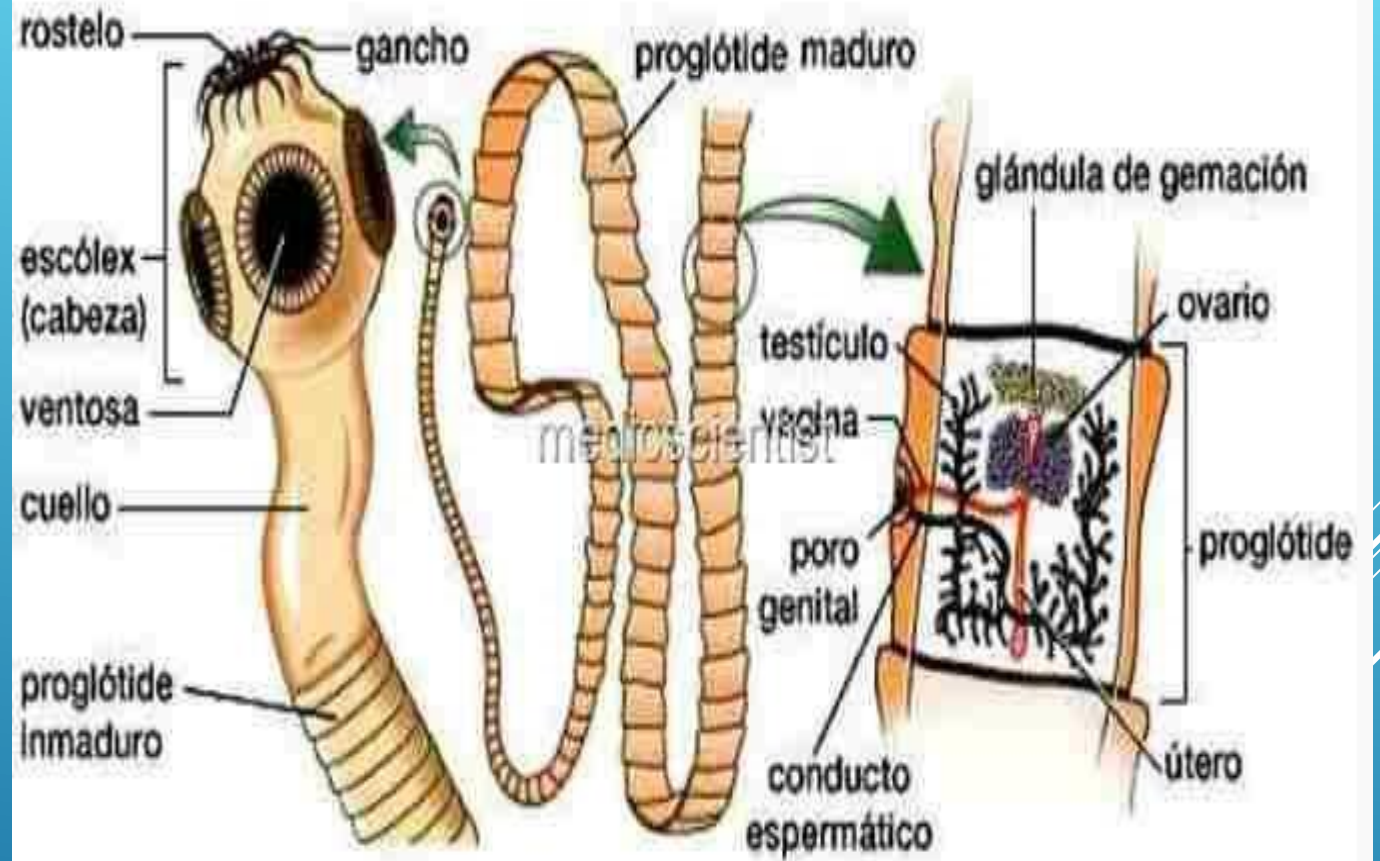
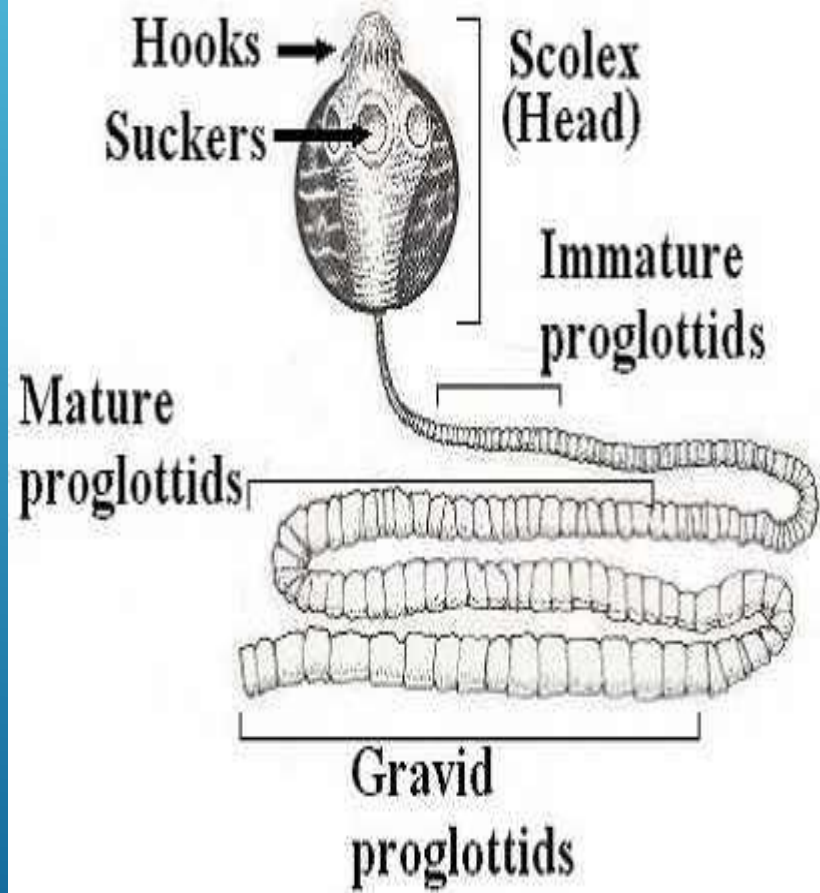


Mature proglottid

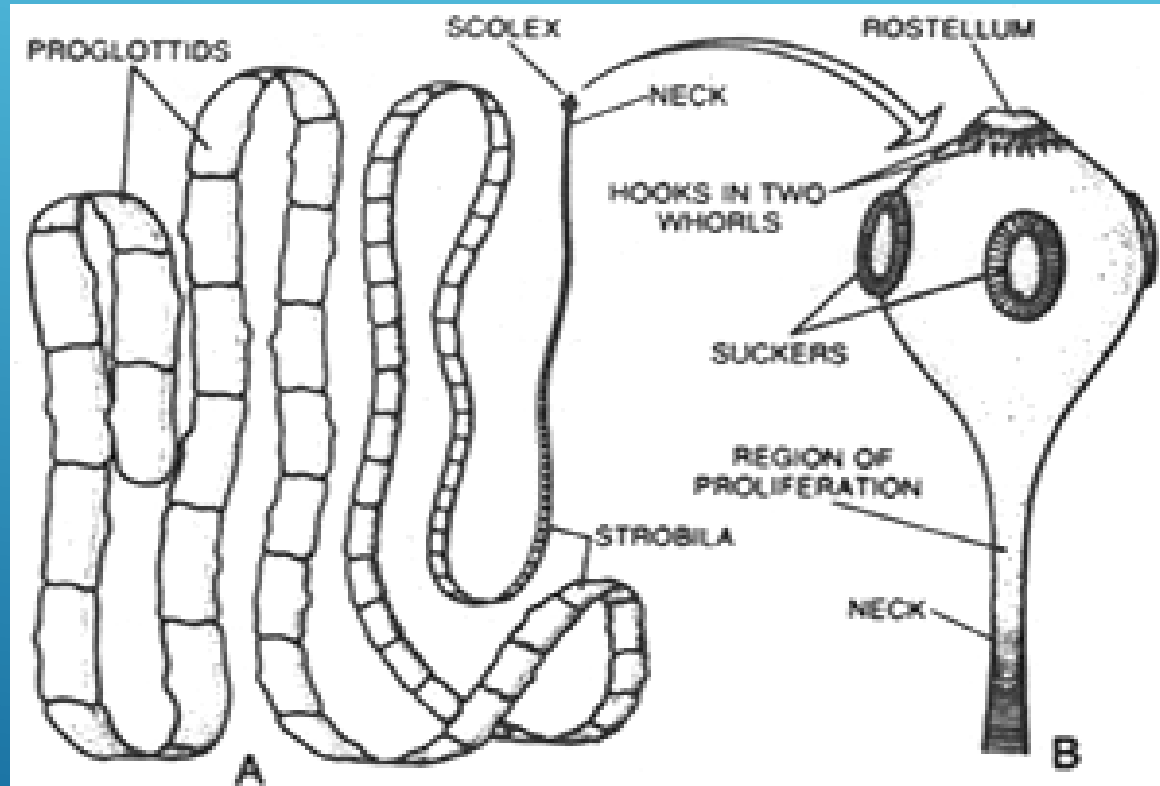


**taenia saginata**

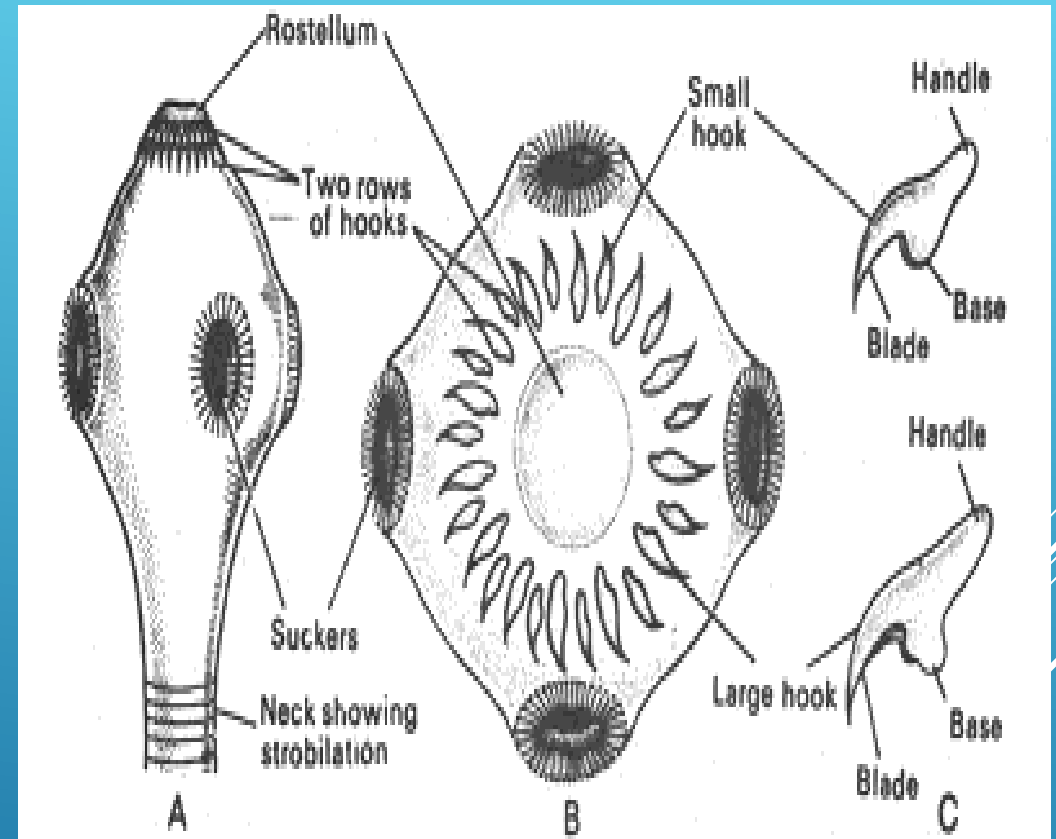
## Taenia solium



taenia solium

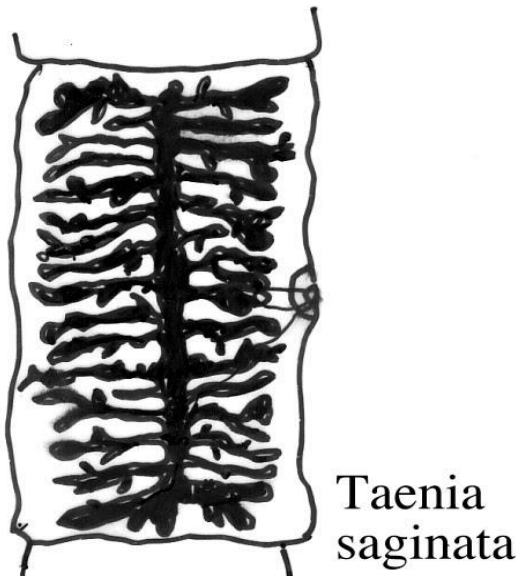
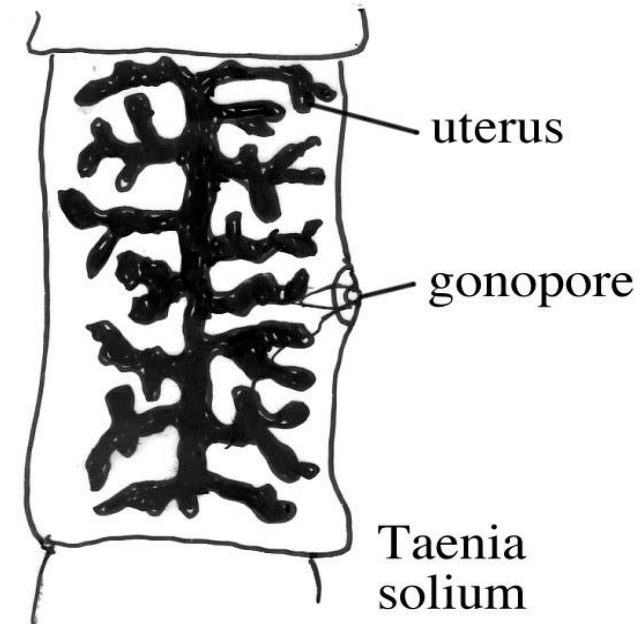


*Taenia solium* : A. whole; B. its scolex

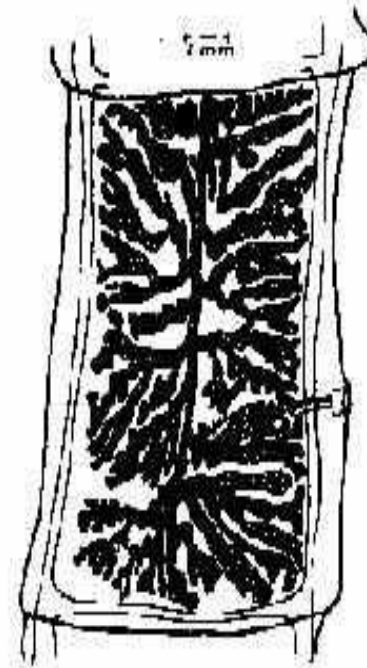


Scolex of *Taenia* : (A) side view; (B) en-face view; (C) hooks

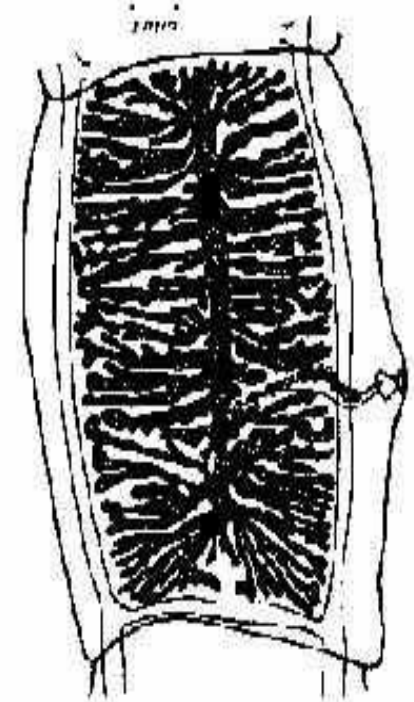




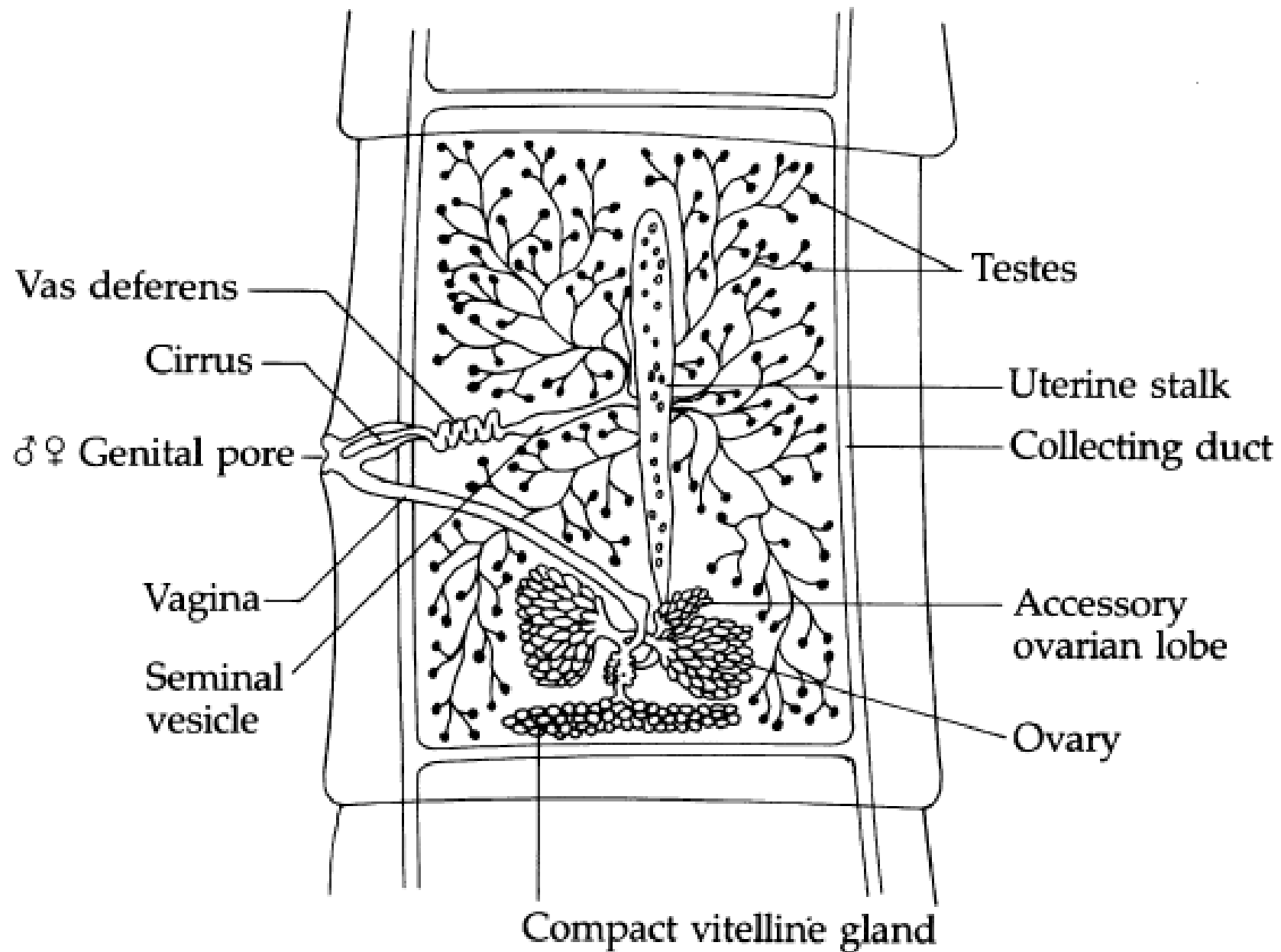
## UTERINE BRANCH COMPARISON



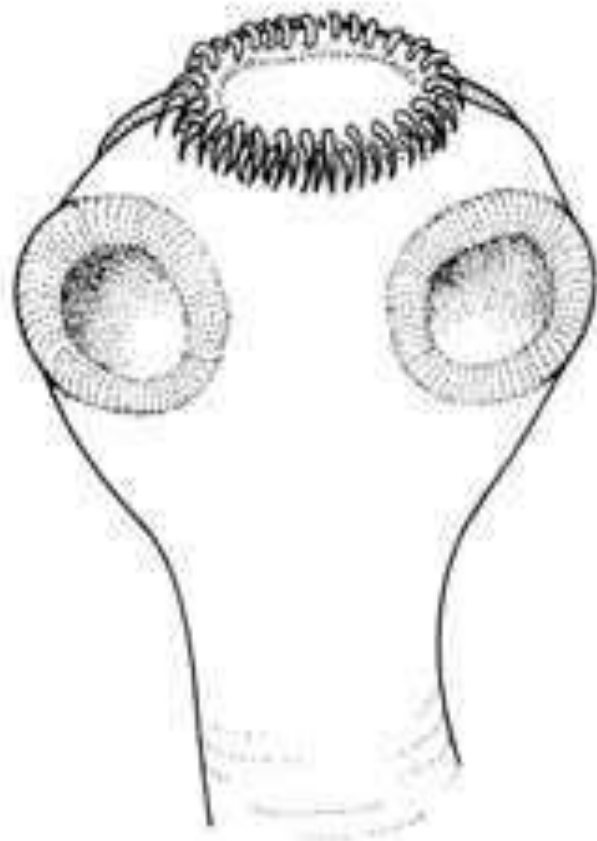
GRAVID PROGLOTTID  
*T. solium*



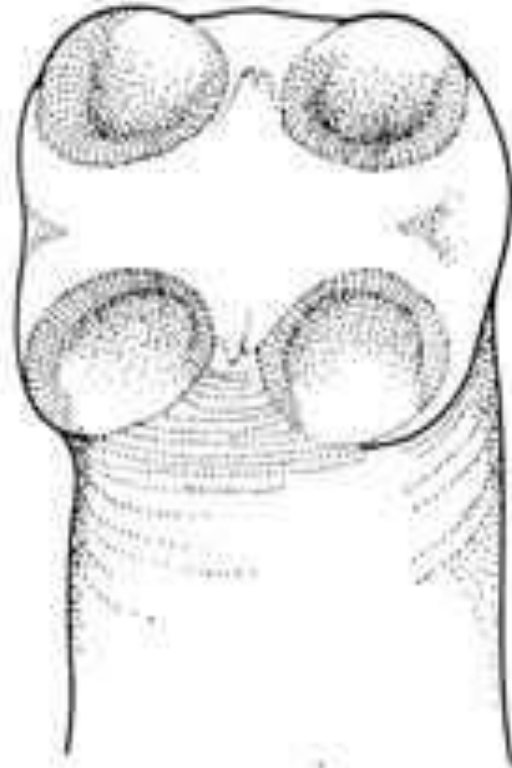
GRAVID PROGLOTTID  
*T. saginata*



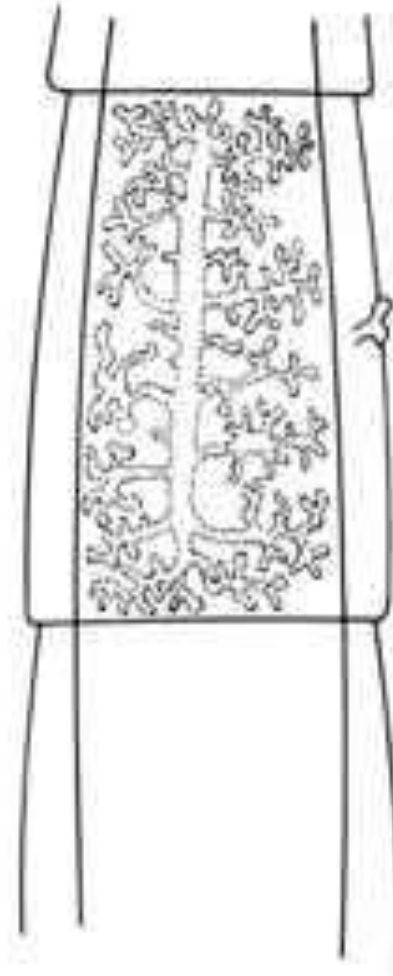
Mature proglottid of *Taenia solium*.



*Taenia solium*



*Taenia saginata*



*Taenia solium*

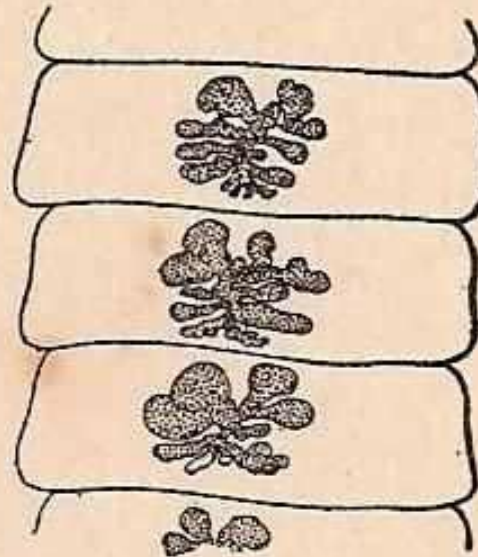
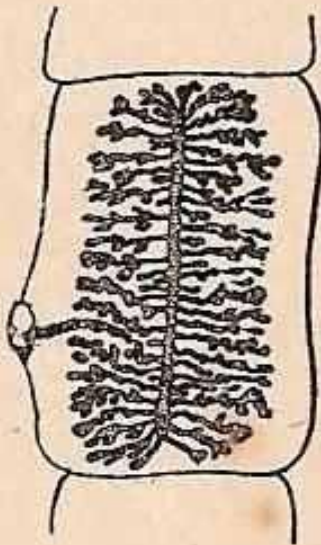
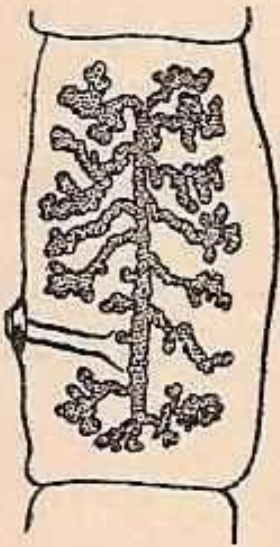
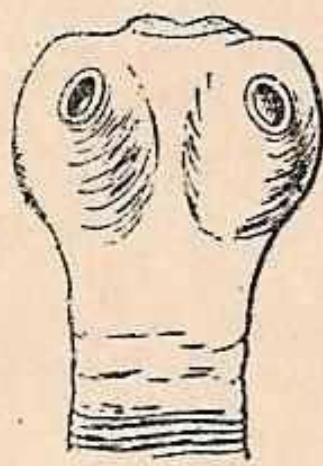
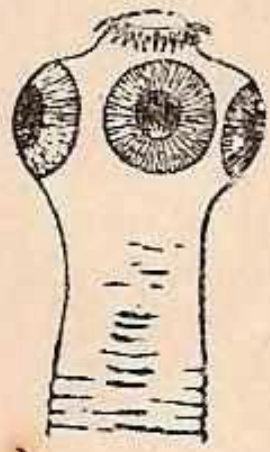


*Taenia saginata*

(a)

(b)





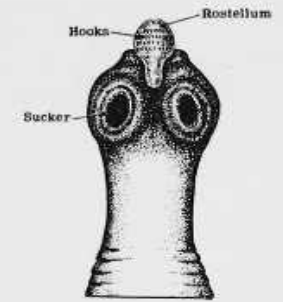
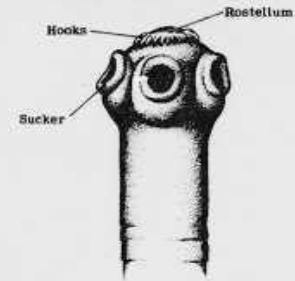
**Taenia  
solium**

**Taenia  
saginata**

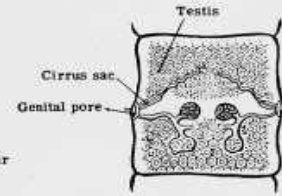
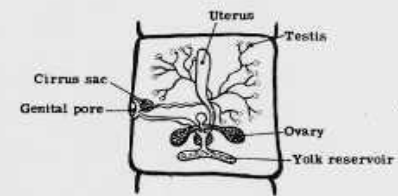
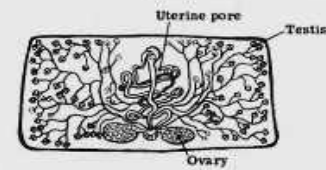
**Diphyllbothrium  
latum**



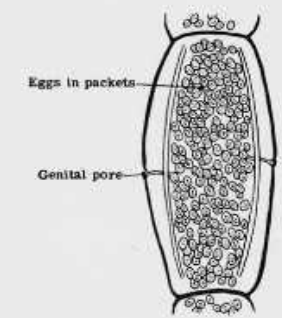
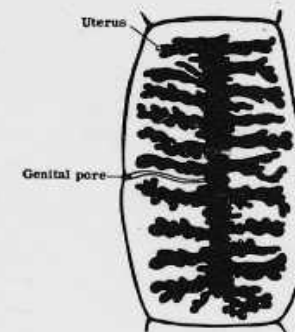
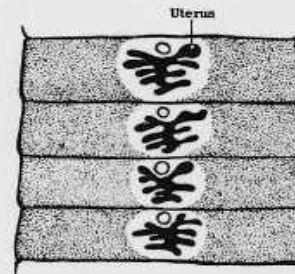
#### ATTACHMENT ORGANS



#### REPRODUCTIVE SYSTEM



#### GRAVID PROGLOTTIDES

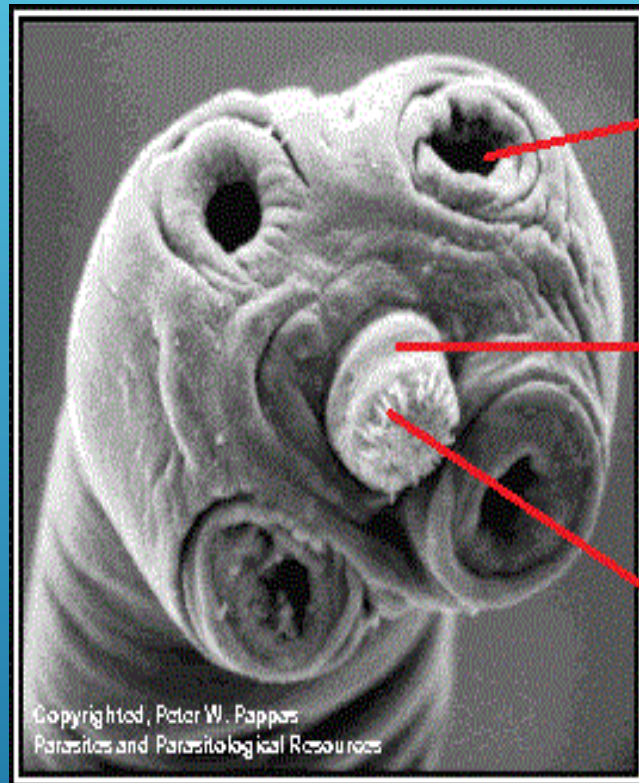


**A**  
**Diphyllbothrium  
latum**

**Taenia solium**

**Hymenolepis  
nana**





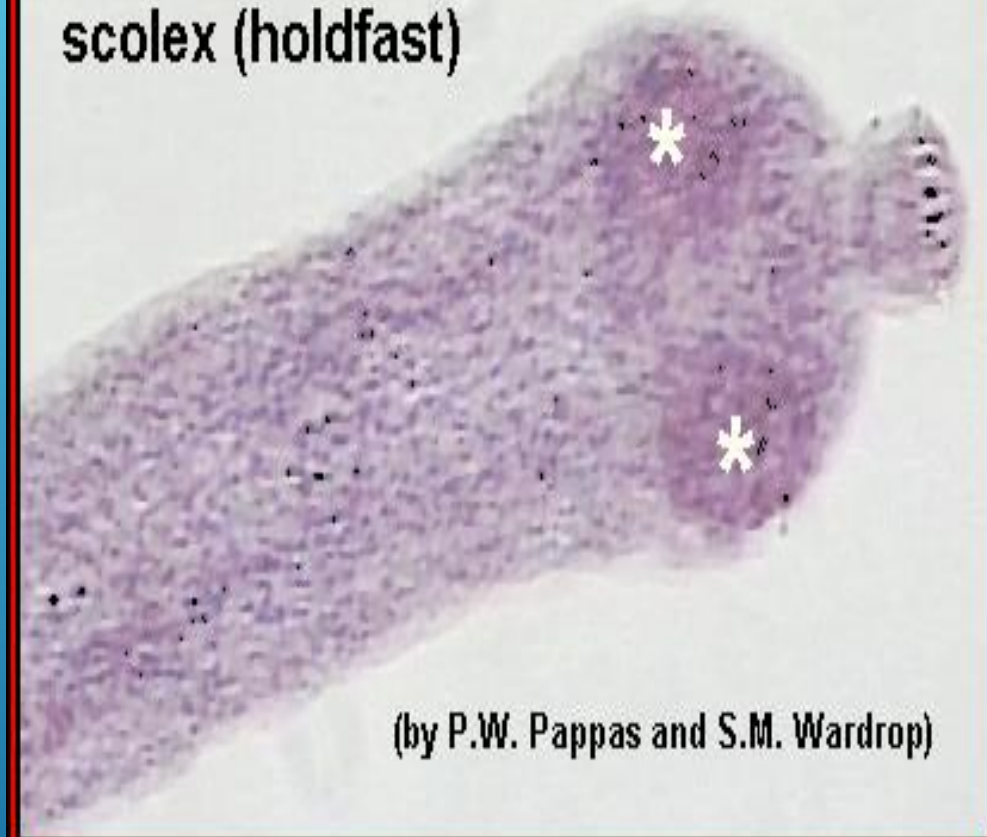
sucker

rostellum

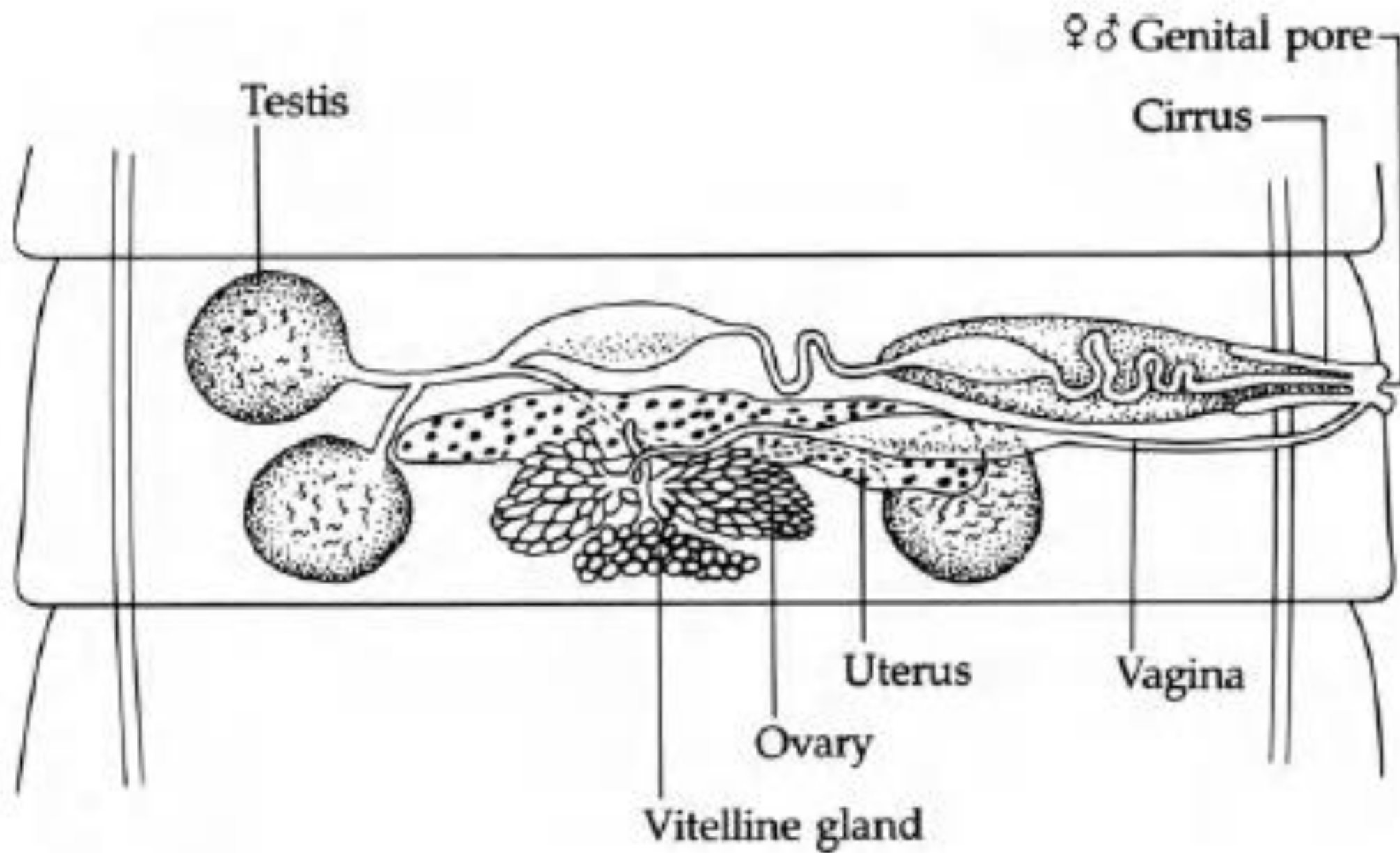
spines of  
rostellum

**Scolex of hymenolepis  
nana**

*Hymenolepis nana*  
scolex (holdfast)



(by P.W. Pappas and S.M. Wardrop)



Mature proglottid of *Hymenolepis nana*.





**Hymenolepis nana egg**



**Hymenolepis nana egg**





**Hymenolepis nana**

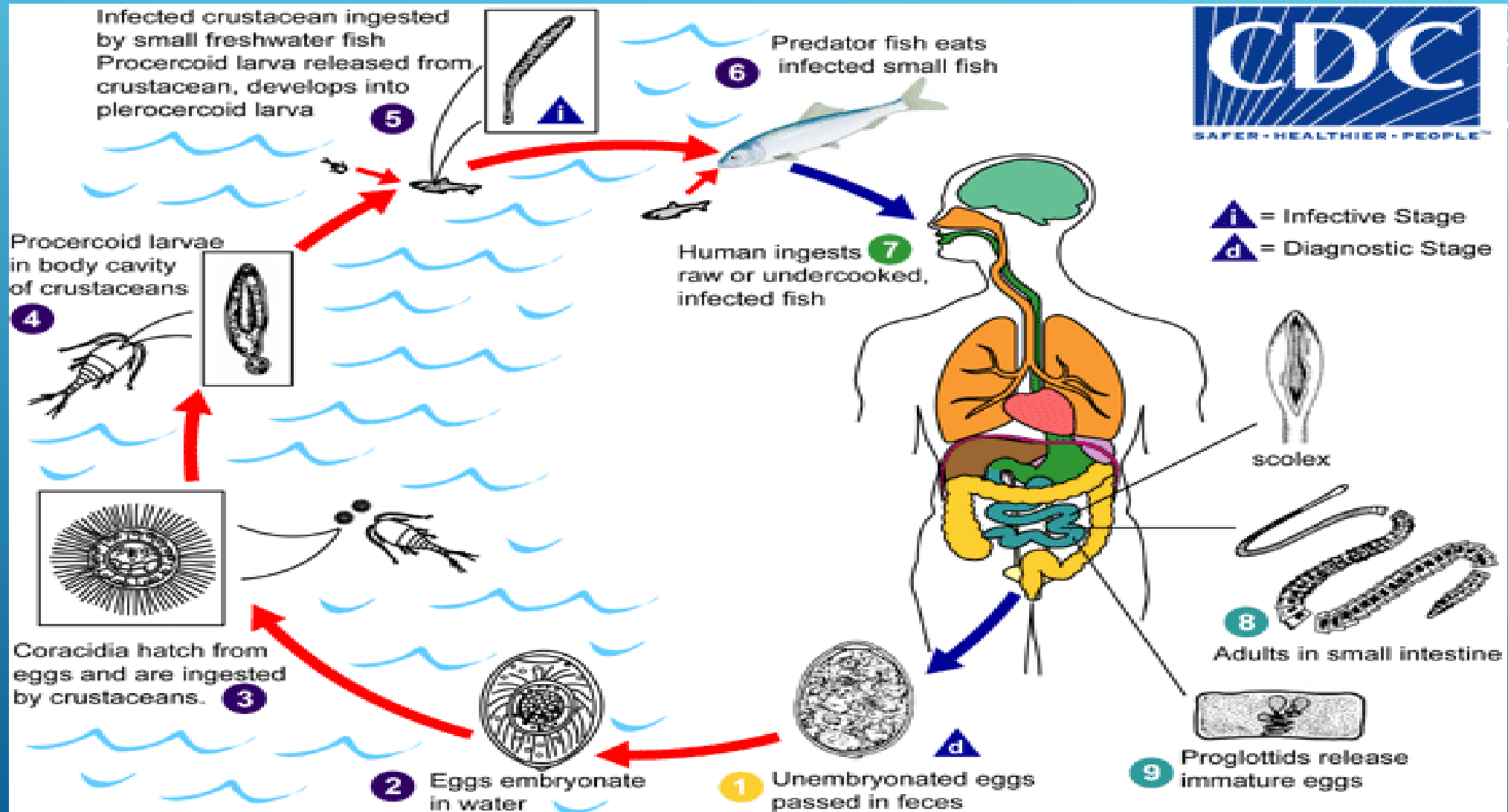
Oregon State Public Health Laboratories

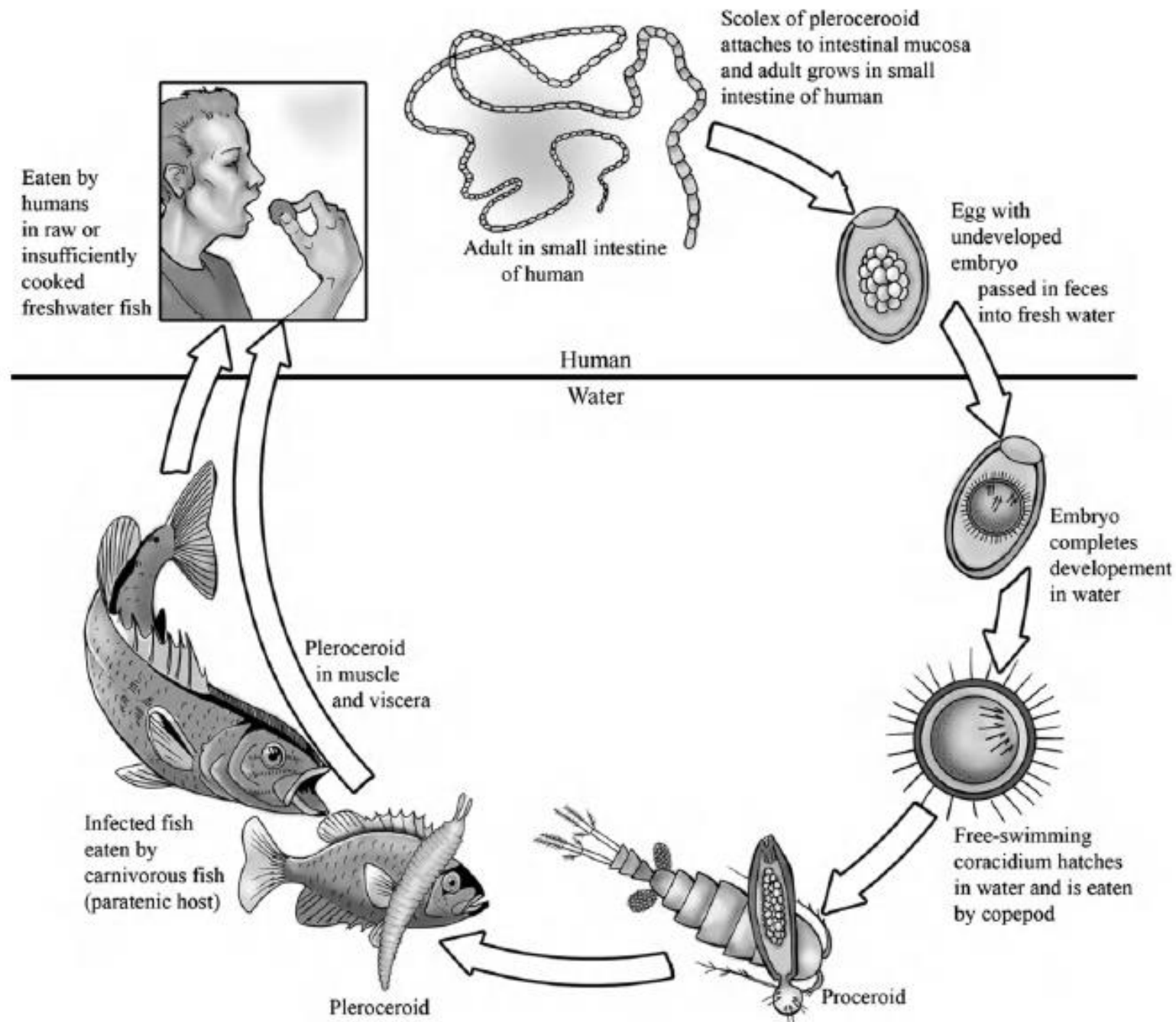


**Hymenolepis nana egg**



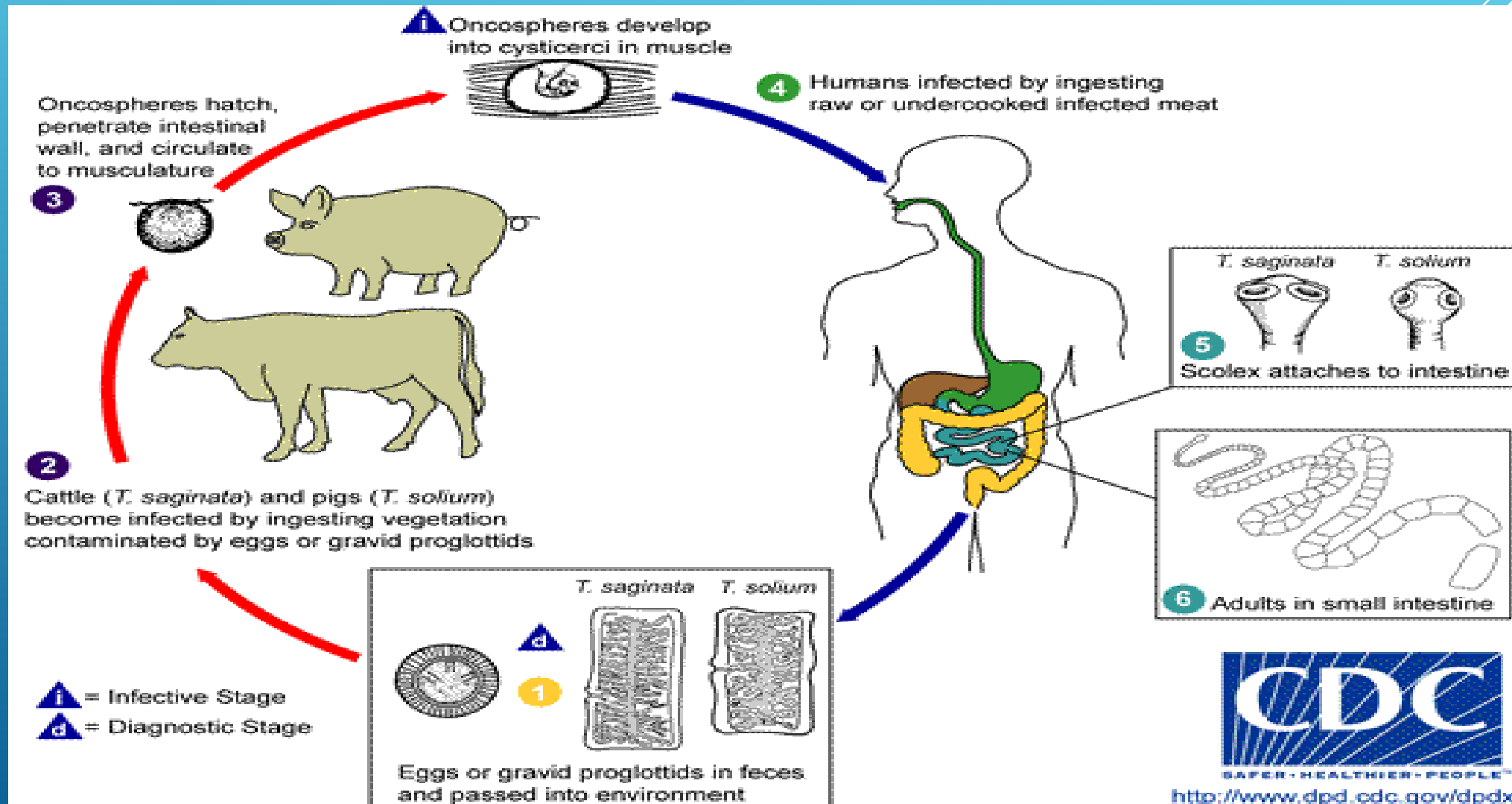
# LIFE CYCLE OF DIPHYLLOBOOTHRIUM LATUM

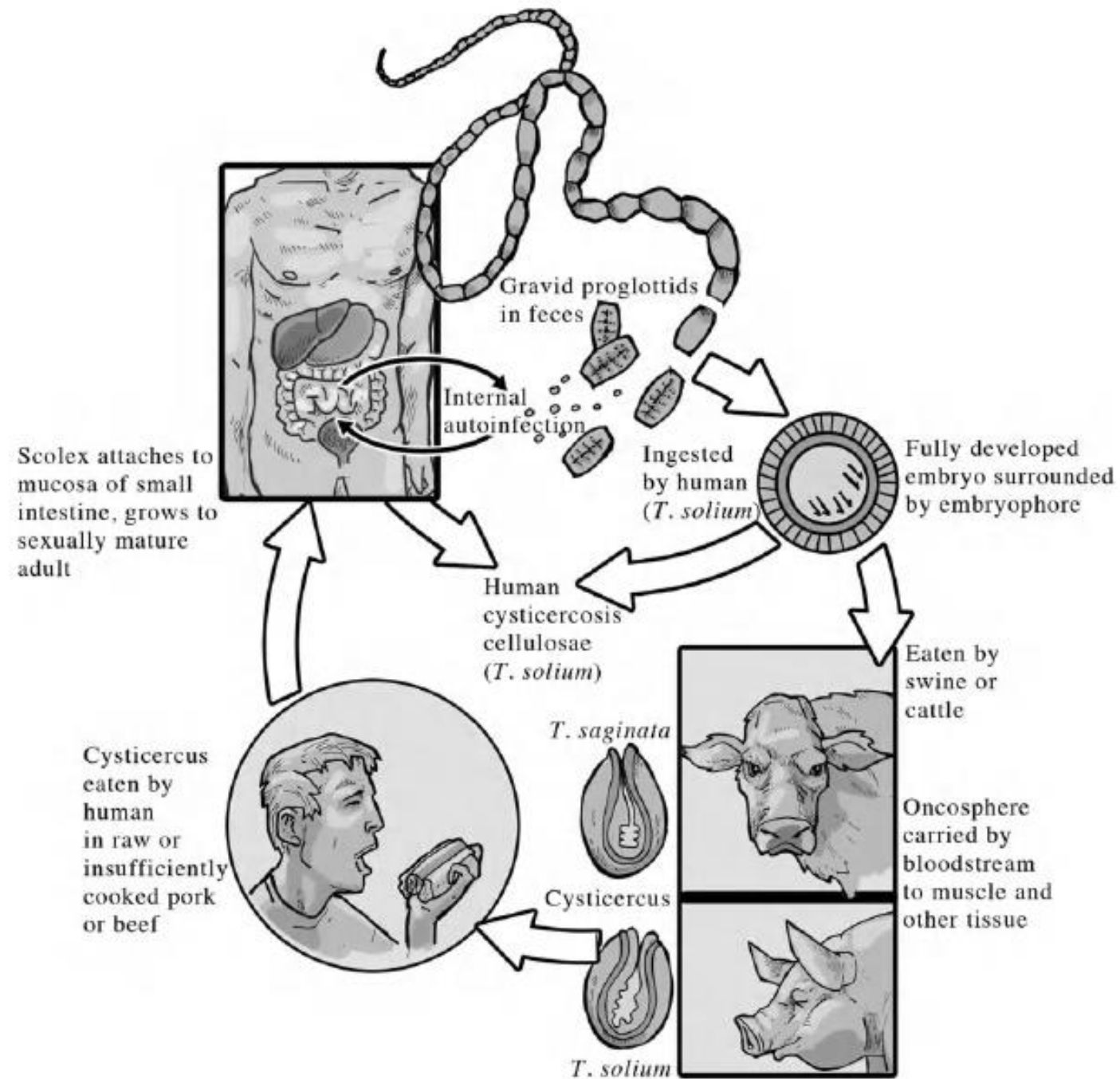




**FIGURE 13-2** Life cycle of *Diphyllobothrium latum*. Credit: Image courtesy of Gino Barzizza.

# LIFE CYCLE OF T.SAGINATA & T.SOLIUM



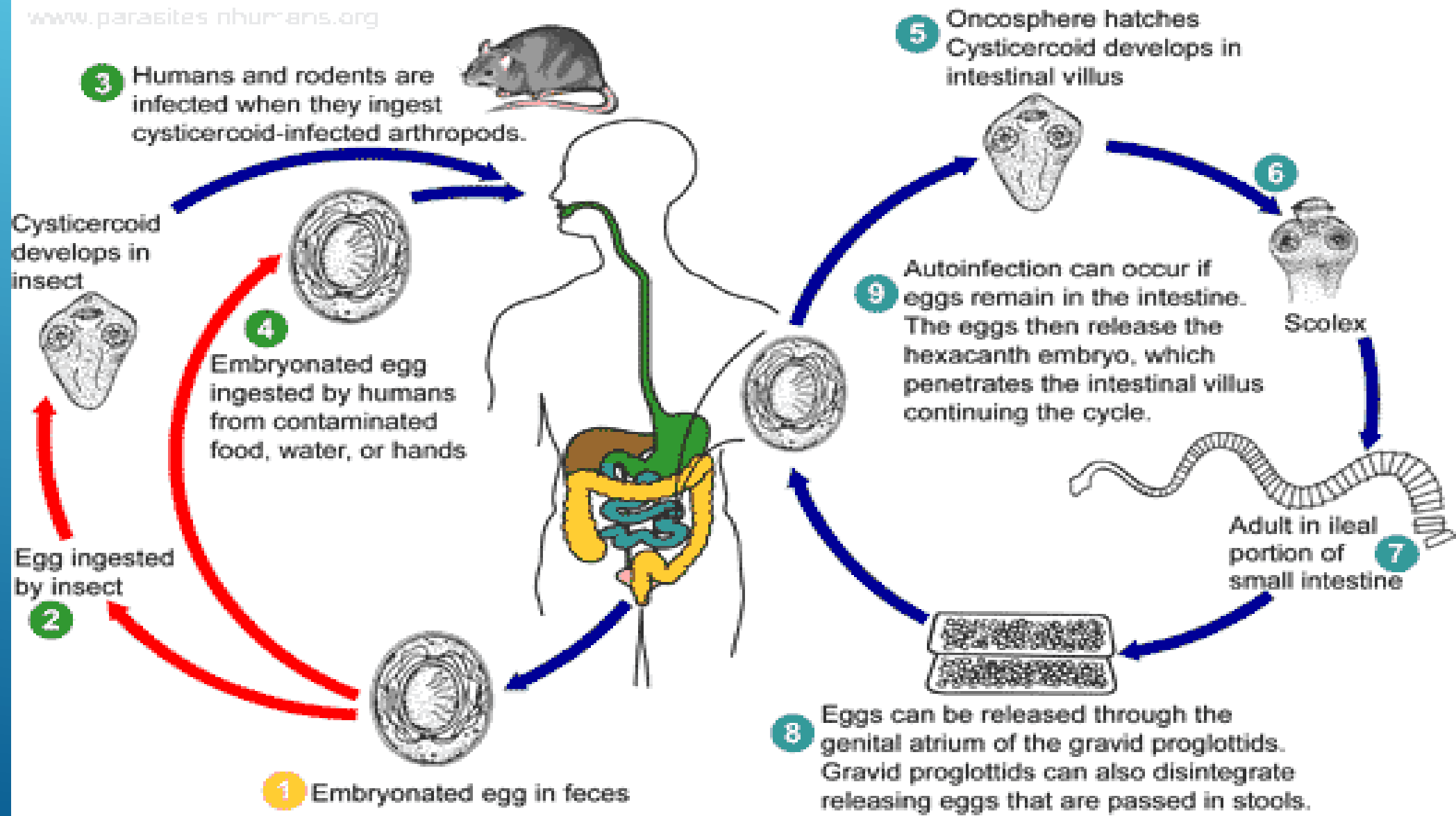


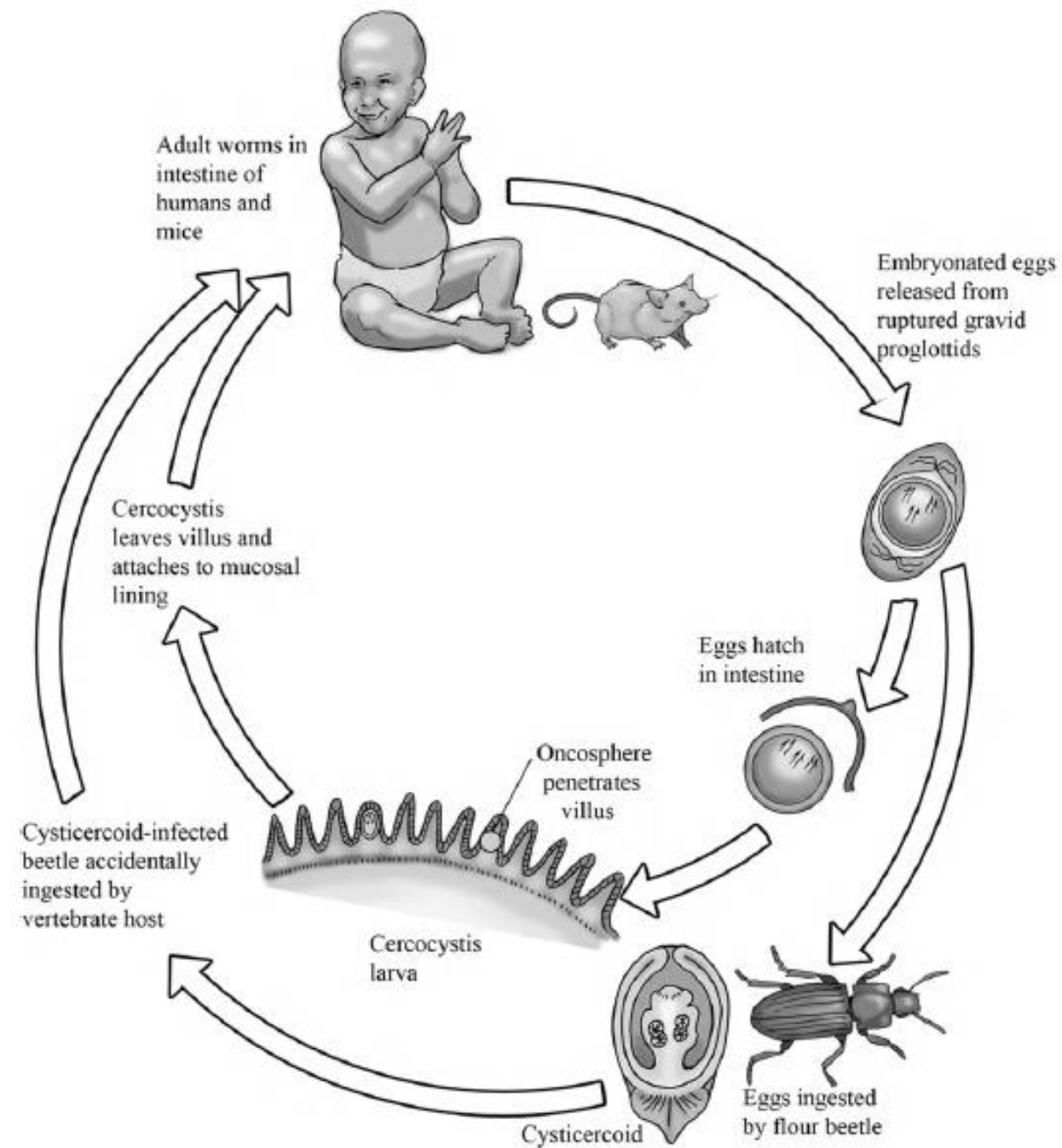
**FIGURE 13-5** Life cycles of *Taenia solium* and *T. saginata*. Credit: Image courtesy of Gino Barzizza.



# LIFE CYCLE OF H.NANA

www.parasites.nhumans.org



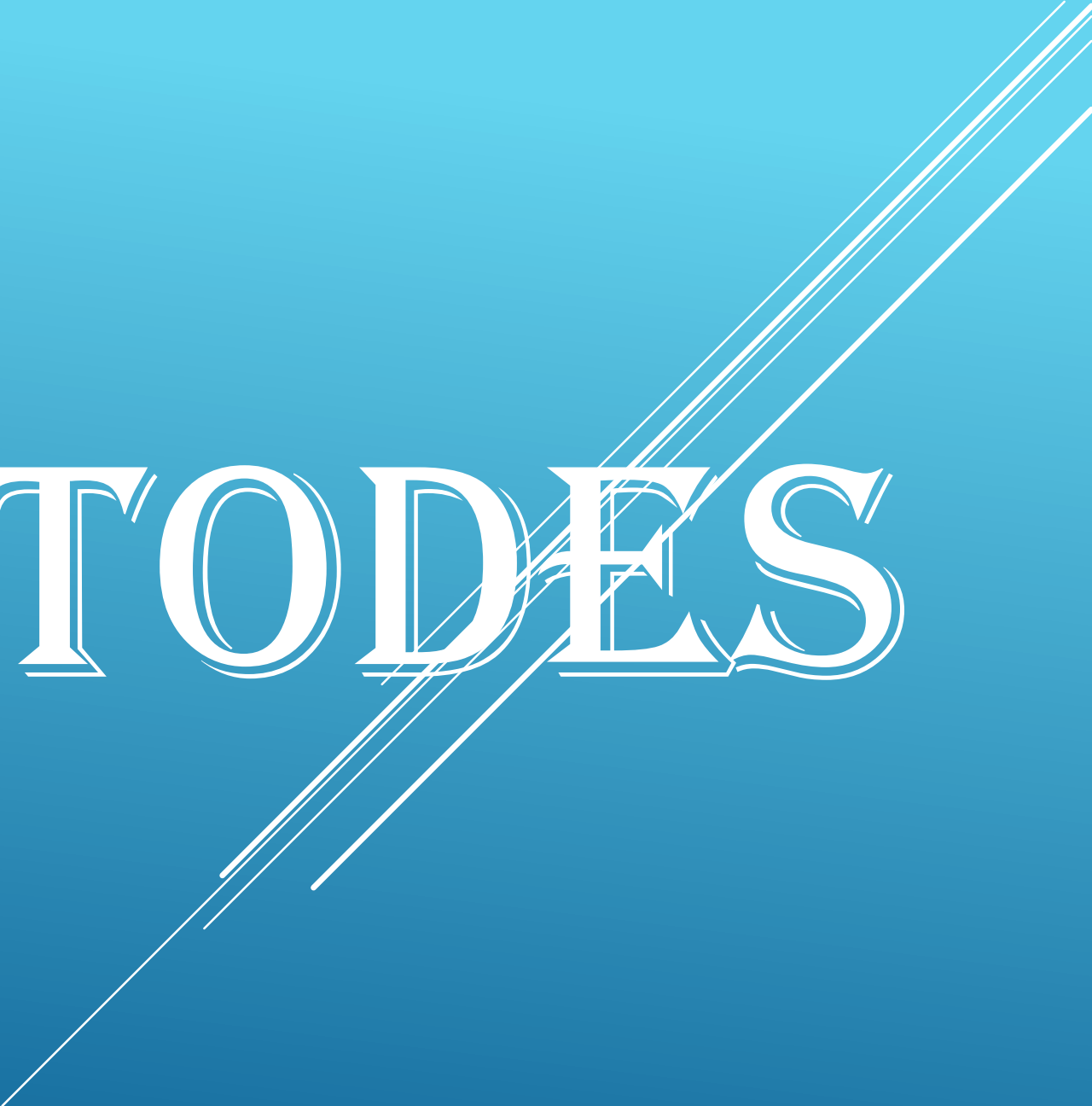


**FIGURE 13-7** Life cycle of *Hymenolepis nana*. Credit: Image courtesy of Gino Barzizza.

😊 SMILE 😊



# NEMATODES

Several thin, white, parallel lines of varying lengths and angles are positioned in the lower right quadrant of the image, extending from the bottom right towards the center.



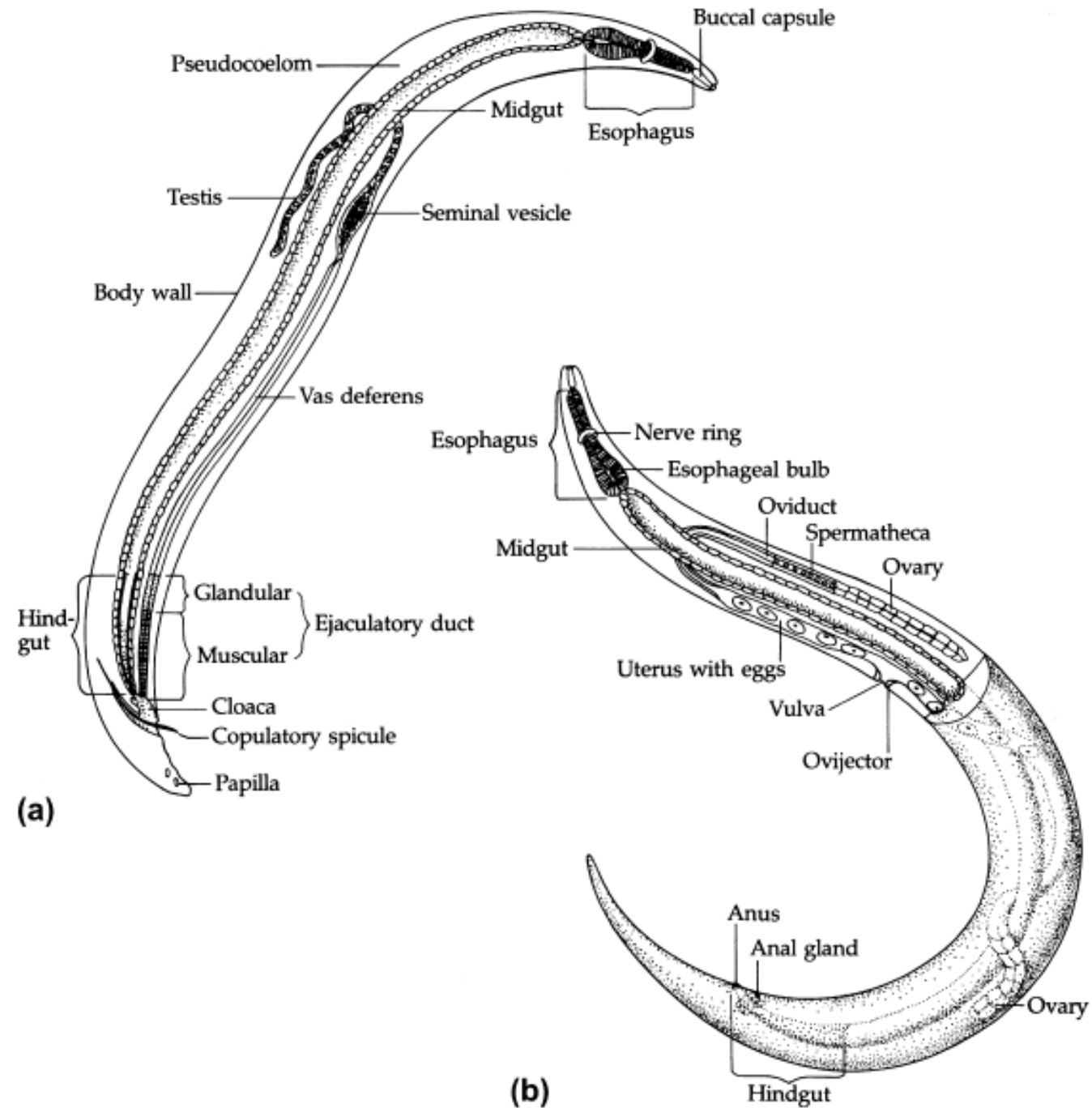
# NEMATODES

Adenophorea\* Aphasmidea\*

- **Trichuris Trichiura**
- **Capillaria Philippinensis**

Secernentea\* Phasmidea\*

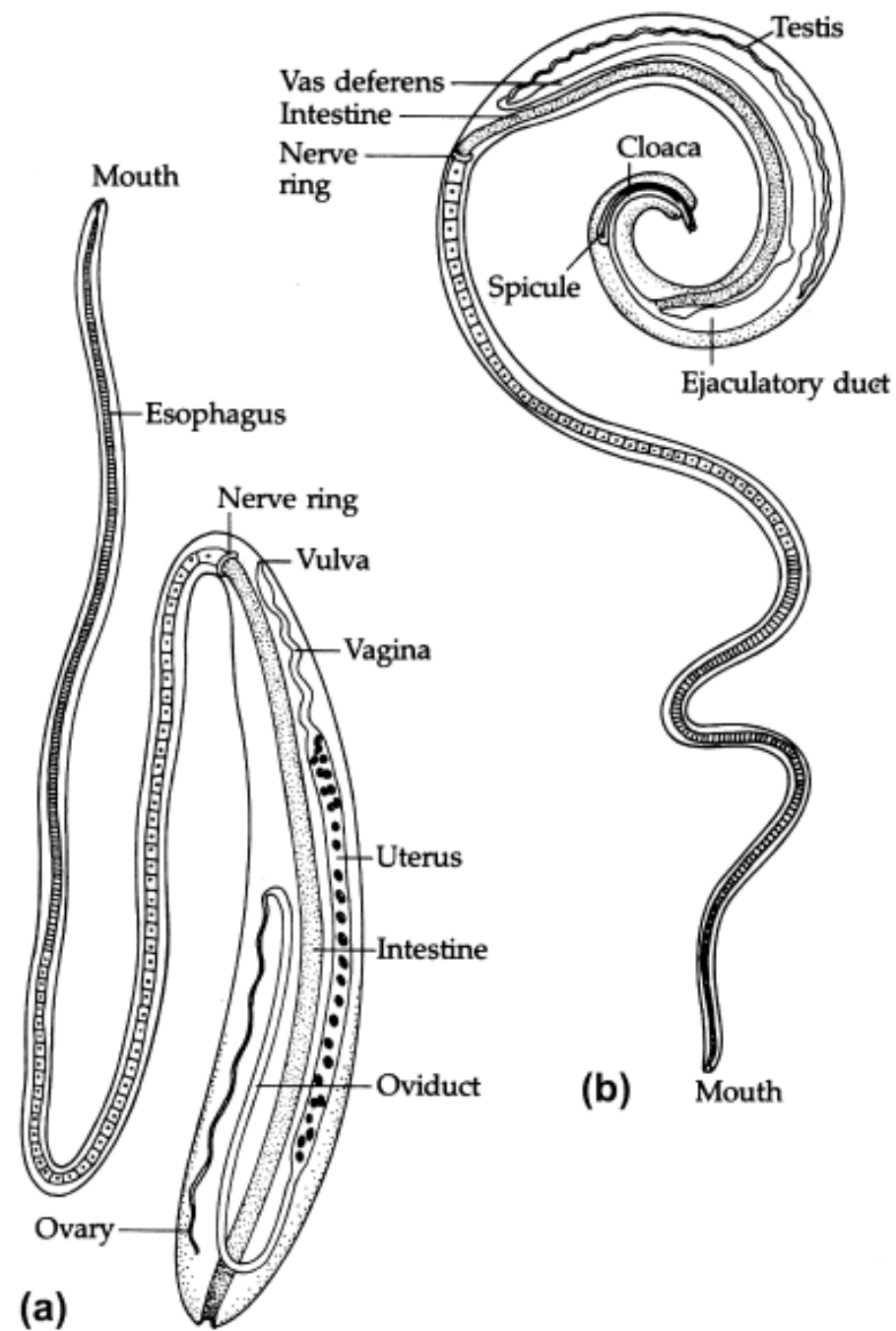
- **Enterobius Vermicularis**
- **Ascaris Lumbricoides**
- **Strongyloides Stercoralis**
- **Ancylostoma Duodenale**



**FIGURE 15-1** Morphology of a generalized nematode. (a) Male. (b) Female.

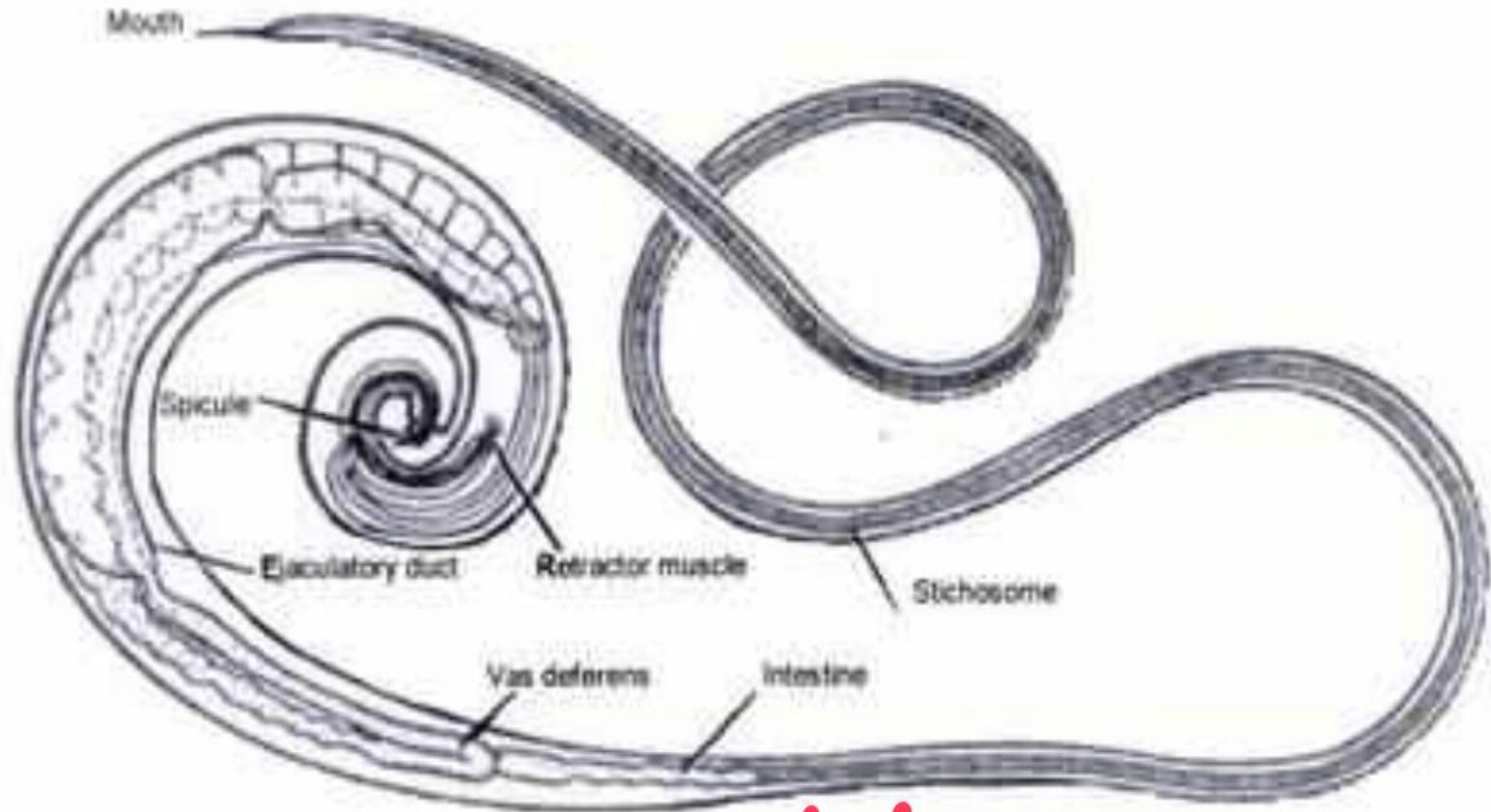
TRICHURIS TRICHIURA

\*WIPEWORM\*



**FIGURE 16-1** Adult *Trichuris trichiura*. (a) Female. (b) Male.



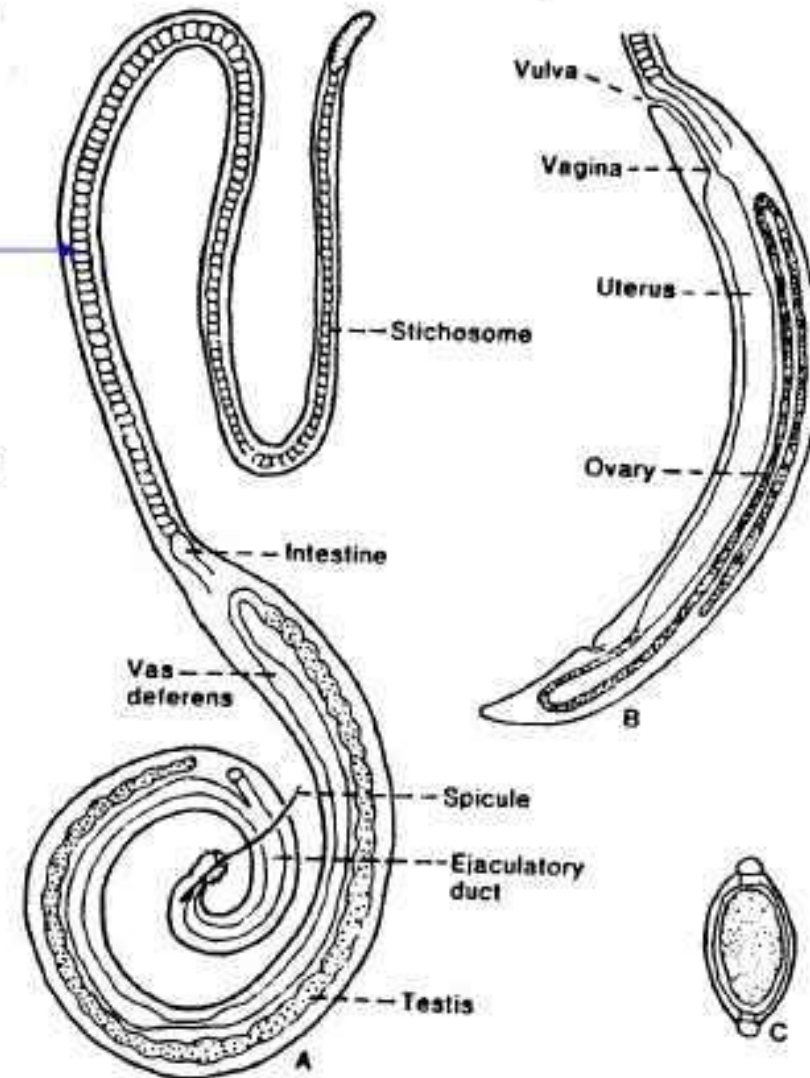
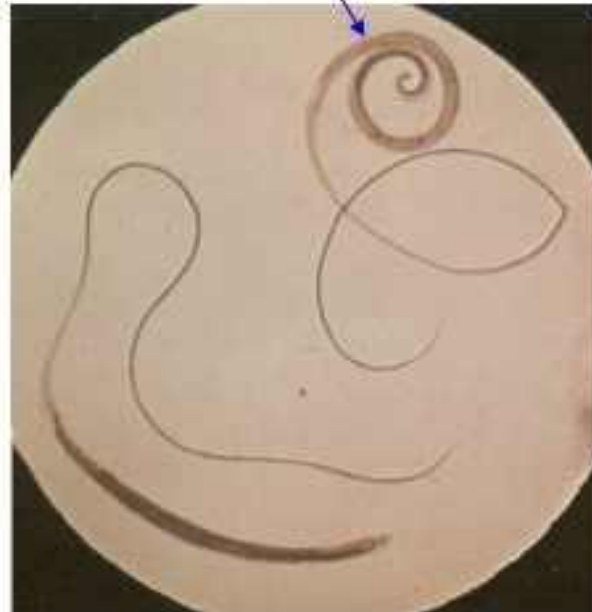


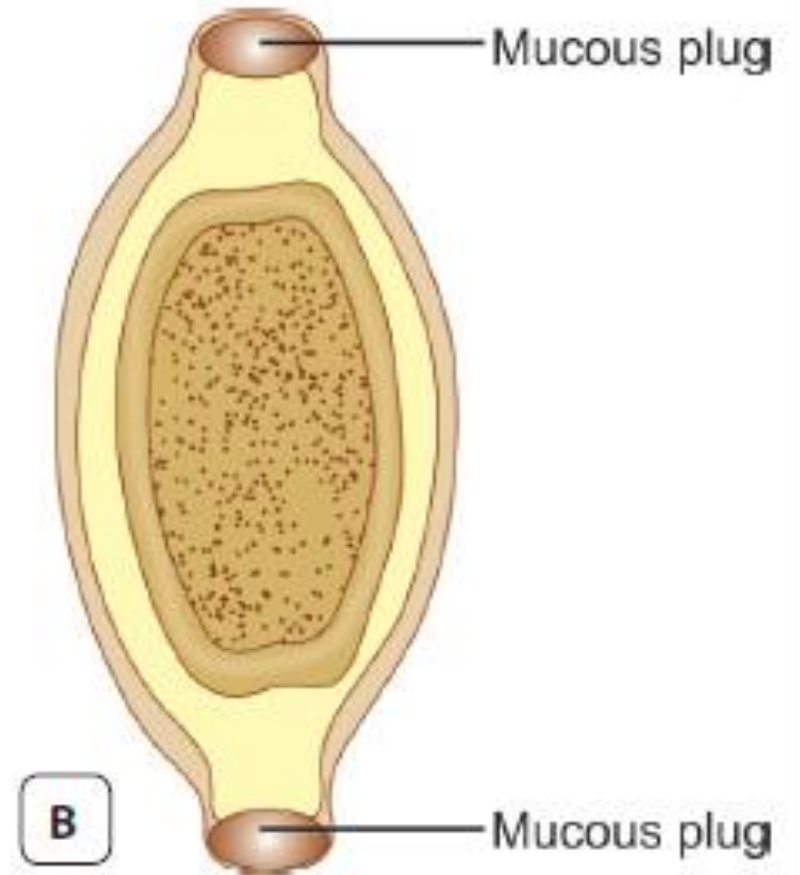
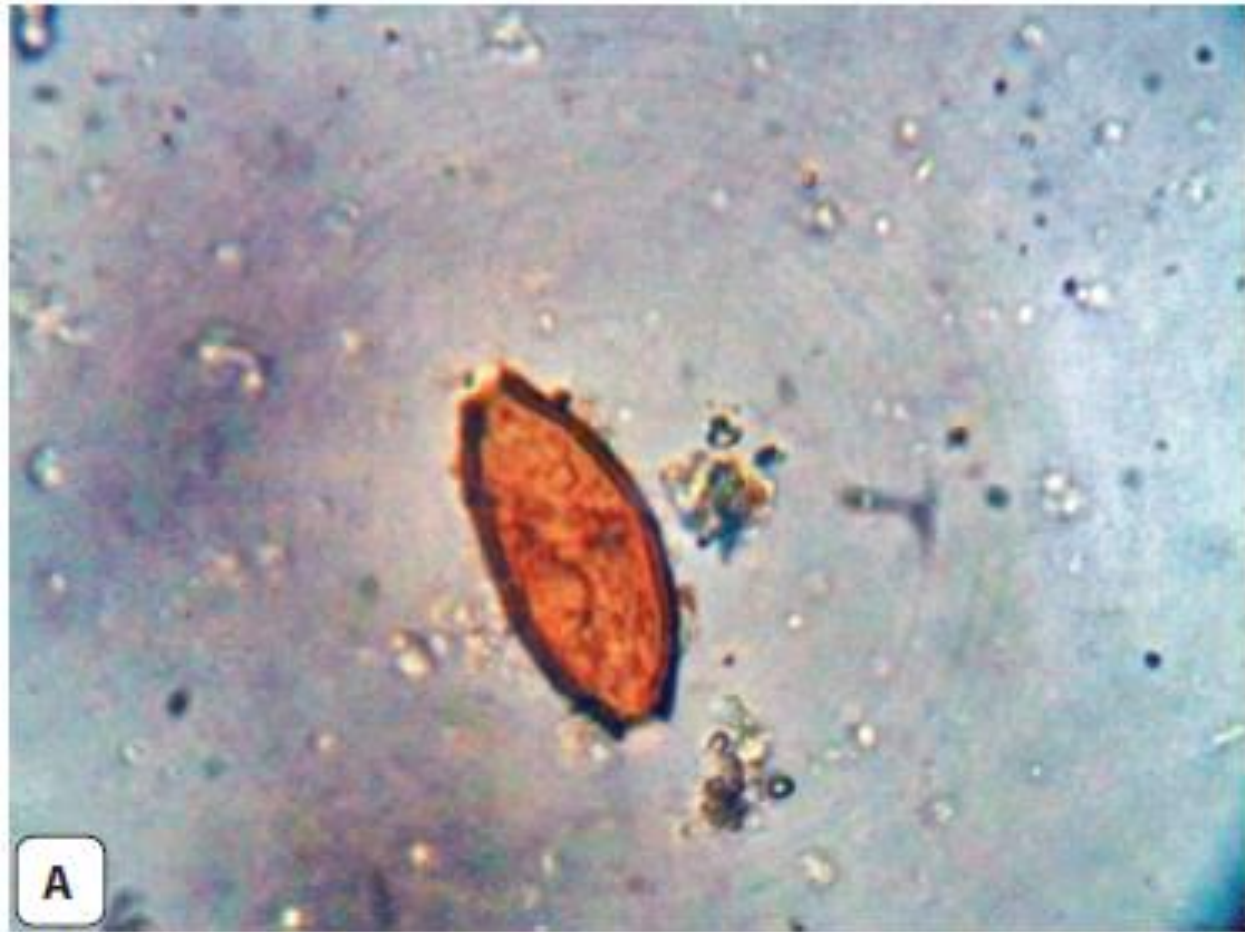
Trichuris trichiura Male

# *Trichuris trichiura*

ADULTS measure 30 to 50 mm in length.

- Anterior end is narrow and threadlike; consists of a long glandular esophagus called the \_\_\_\_\_
- Posterior end is thickened and contains the intestine and tubular reproductive organs. Male has coiled posterior end due to spicule.

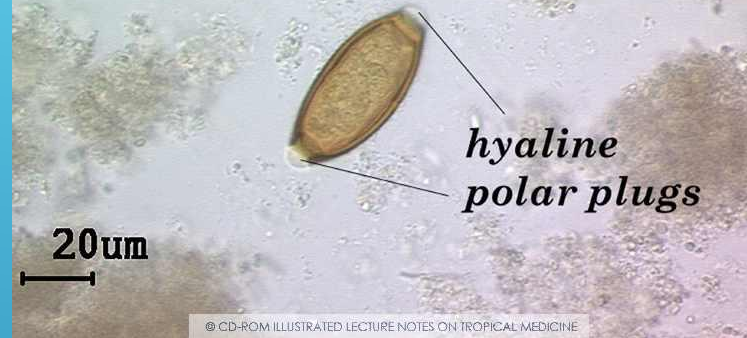




**Fig. 16.2:** Egg of *Trichuris trichiura*. **A.** As seen under microscope; **B.** Schematic diagram



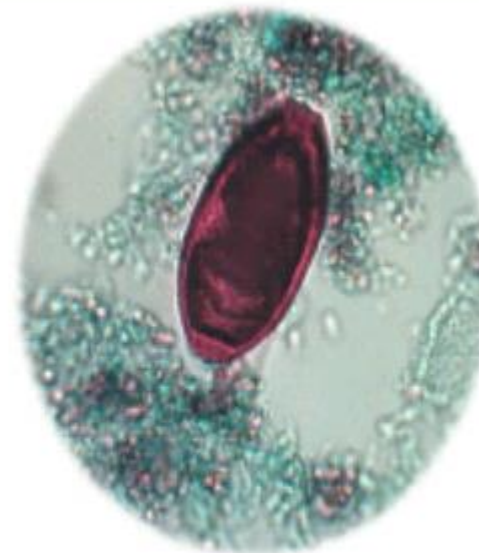
## *Trichuris trichiura* egg



Mucoid end-plugs

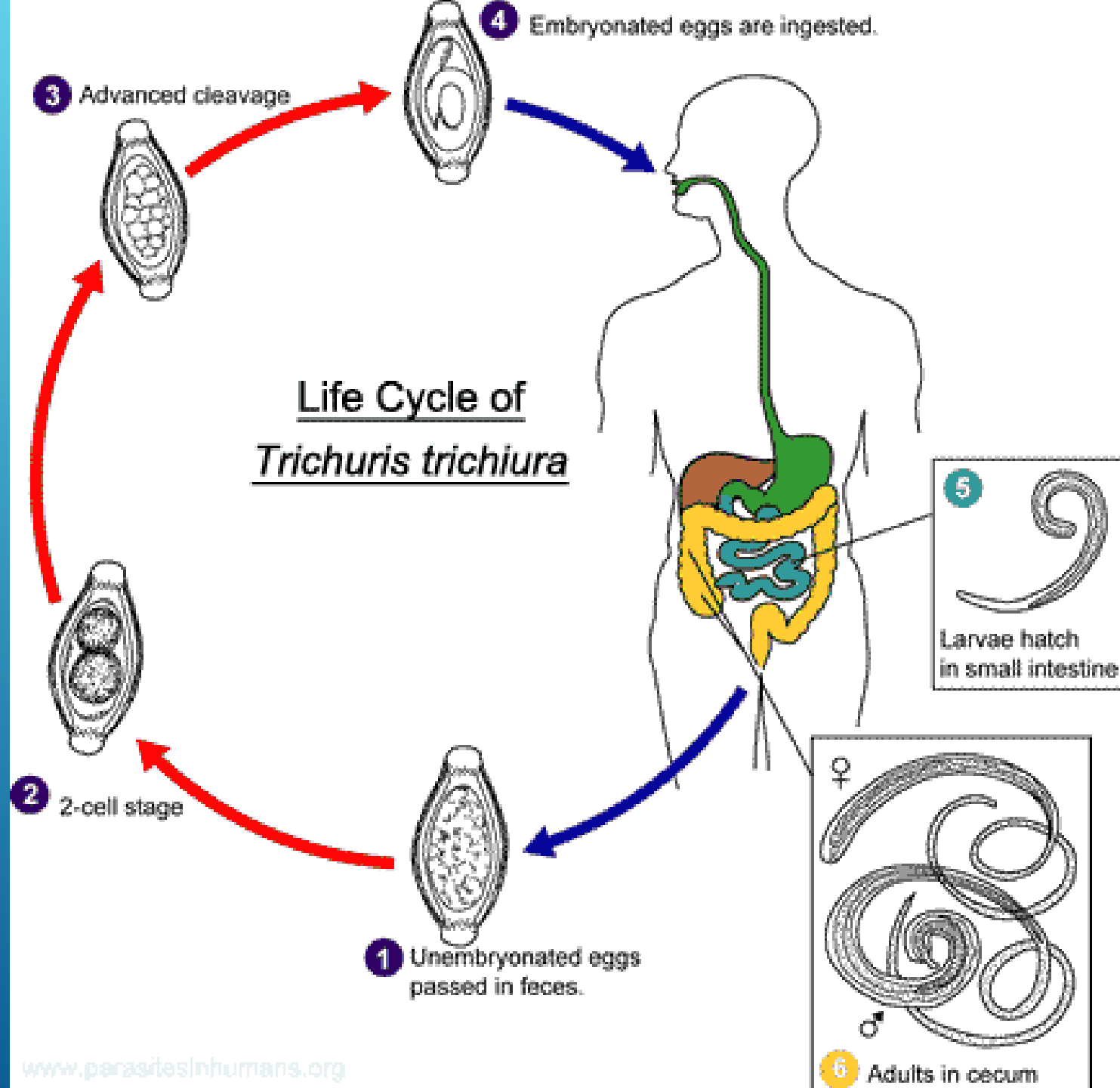
Thick shell

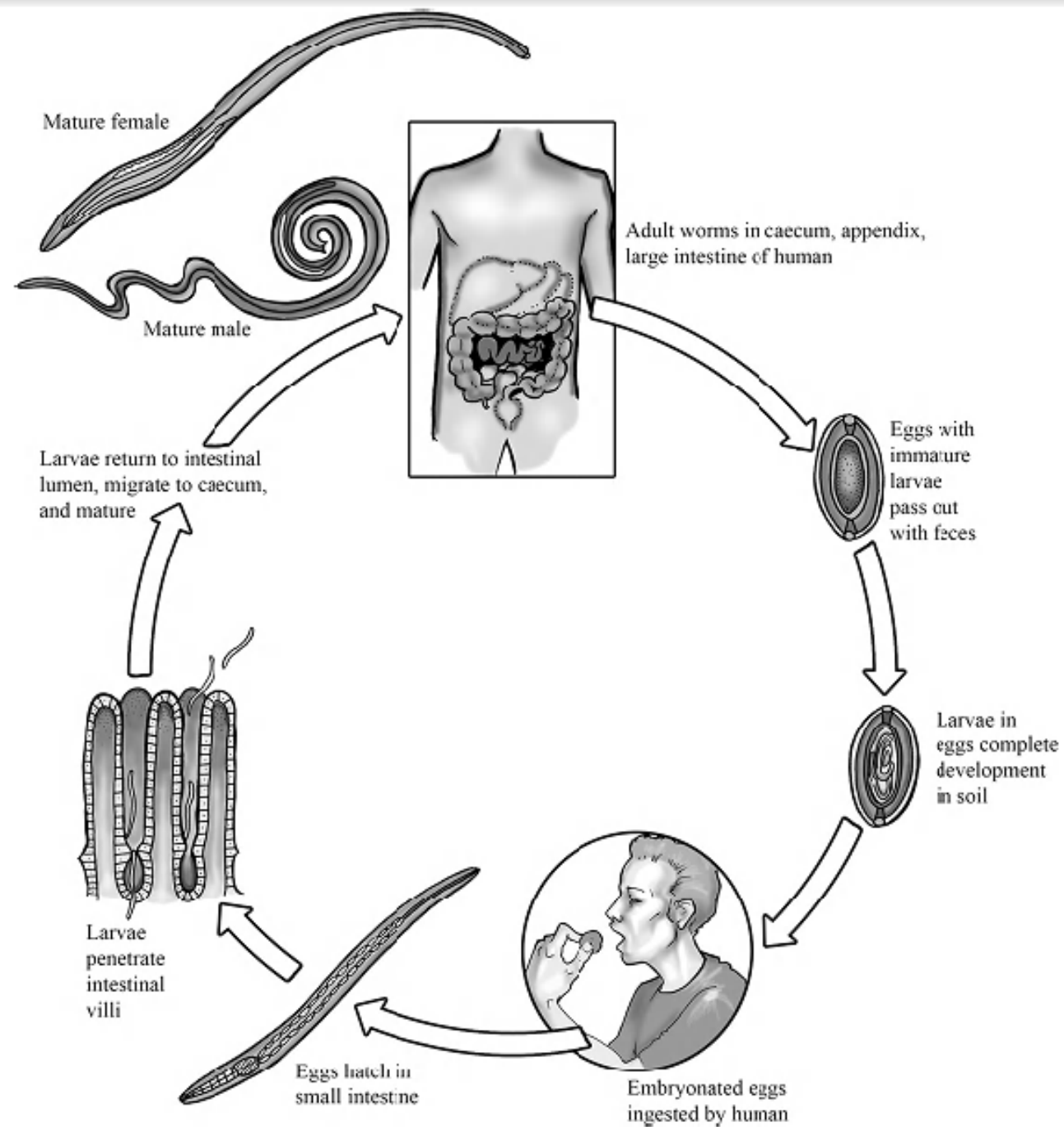
Unembryonated  
interior



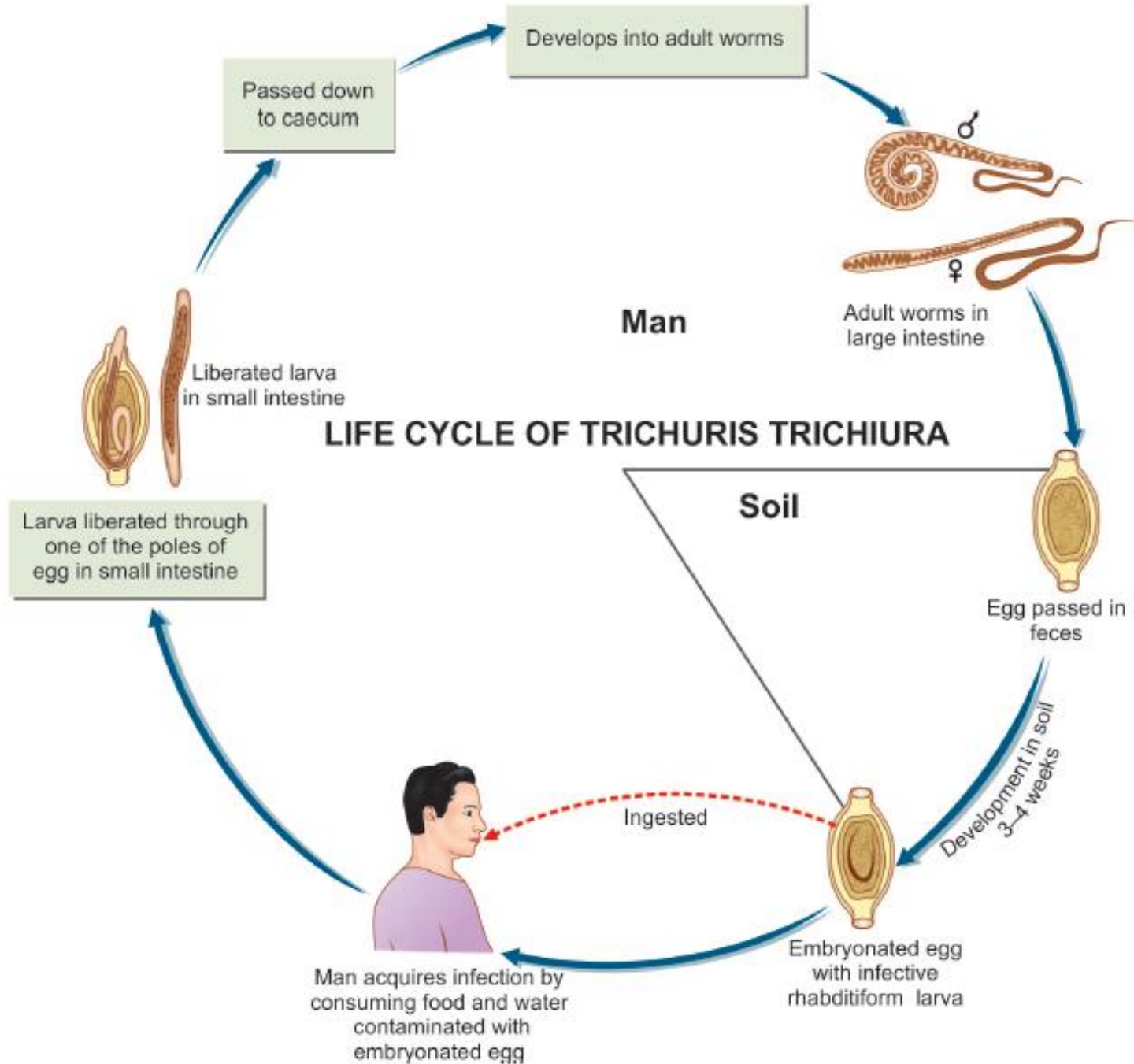
# Egg of trichuris trichiura







**FIGURE 16-2** Life cycle of *Trichuris trichiura*. Credit: Image courtesy of Gino Barzizza.



**Fig. 16.3:** Life cycle of *Trichuris trichiura*

CAPILLARIA

PHILIPPINENSIS



# *Capillaria philippinensis*

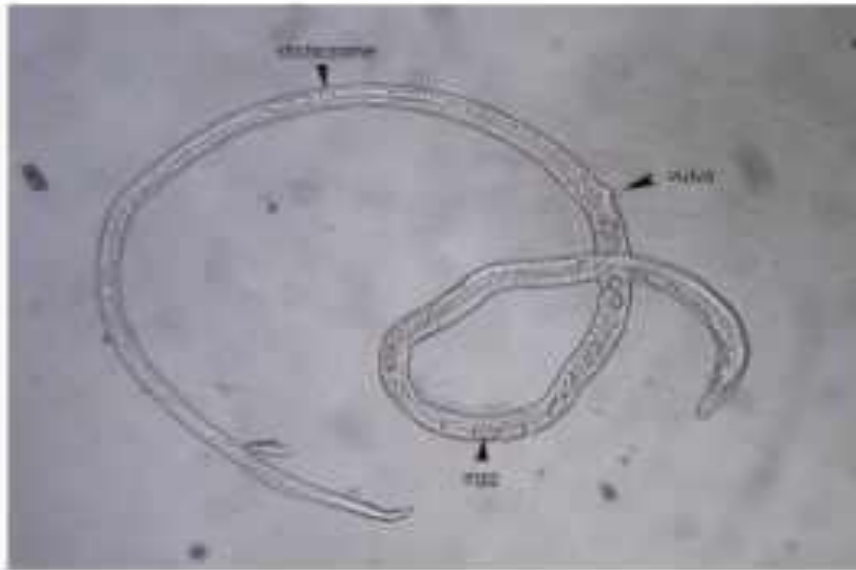
## **Morphology:**

**Female:** 2.5-4.4mm

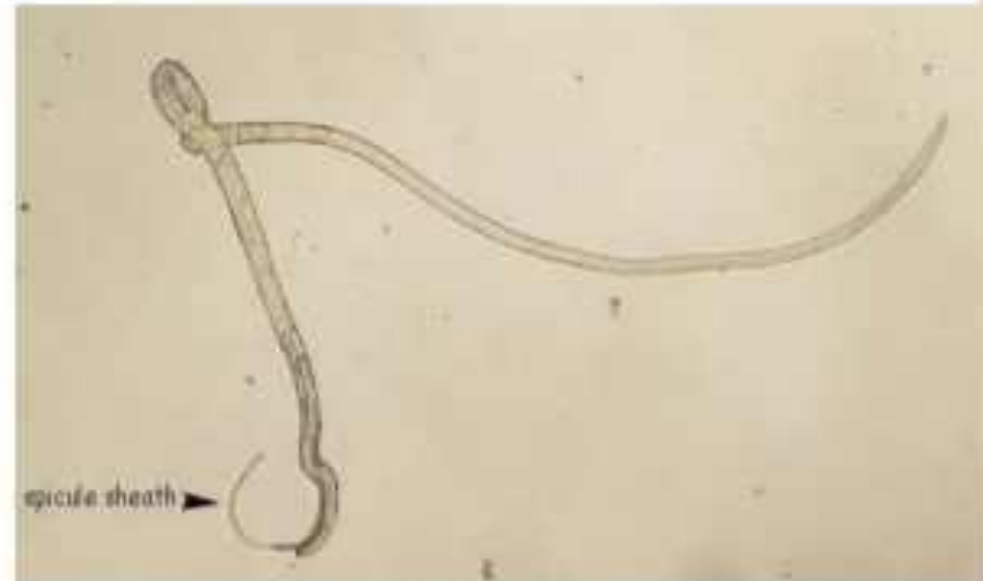
1. Typical Female – egg in uterus (8-10) in single row
2. Atypical Female – viviparous, larvivapous, 40-45 eggs arranged in 2-3 rows

**Male:** 2.2-3.2mm

- with chitinized spicule and a long spicule sheath

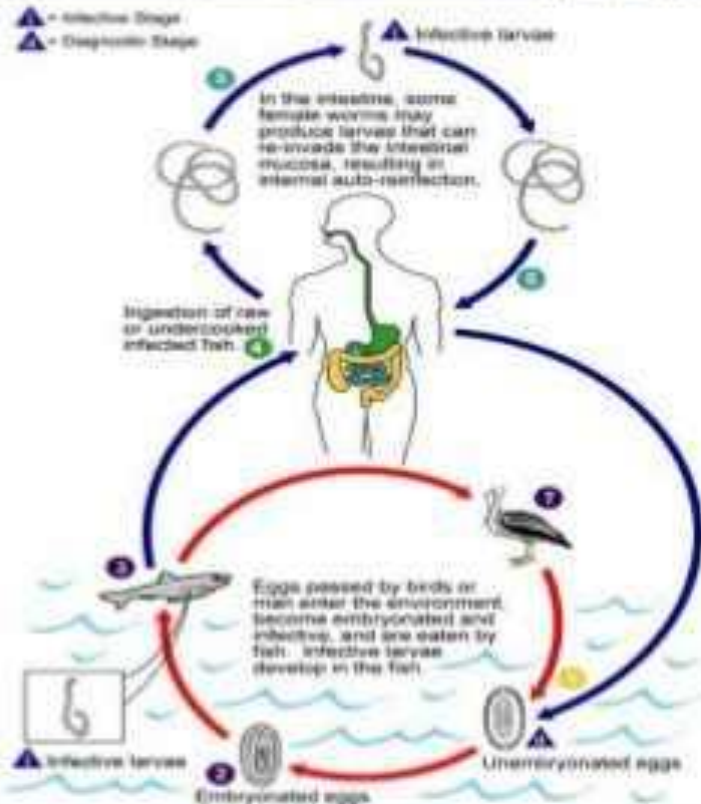
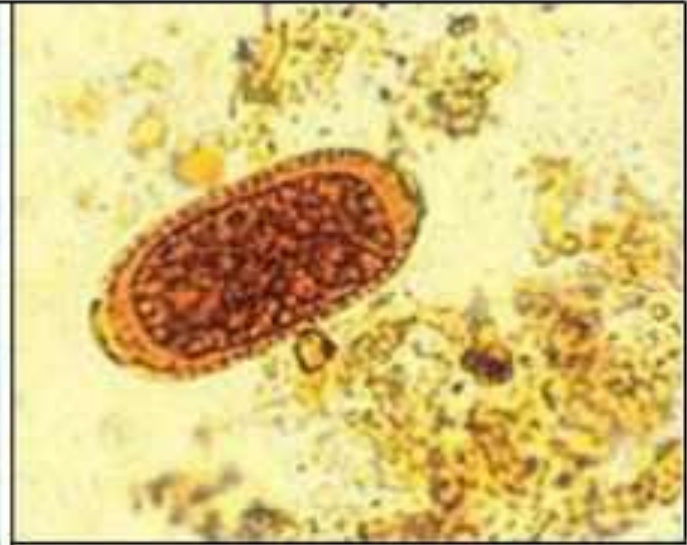
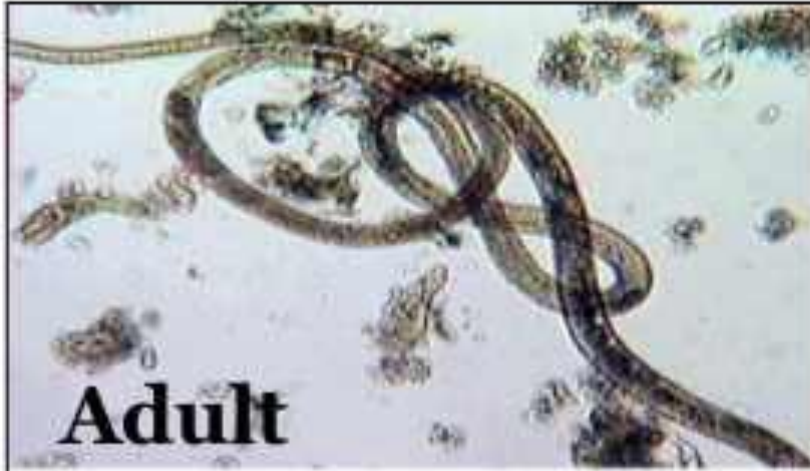


**Female**



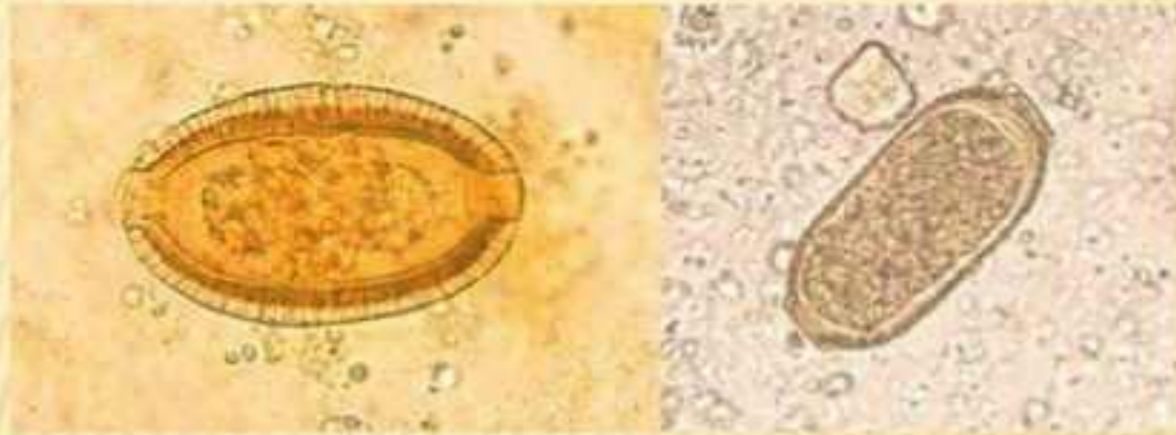
**Male**

# Capillaria philippinensis



**Egg**  
**“Bean shape”**

# CAPILLARIA PHILIPPINENSIS

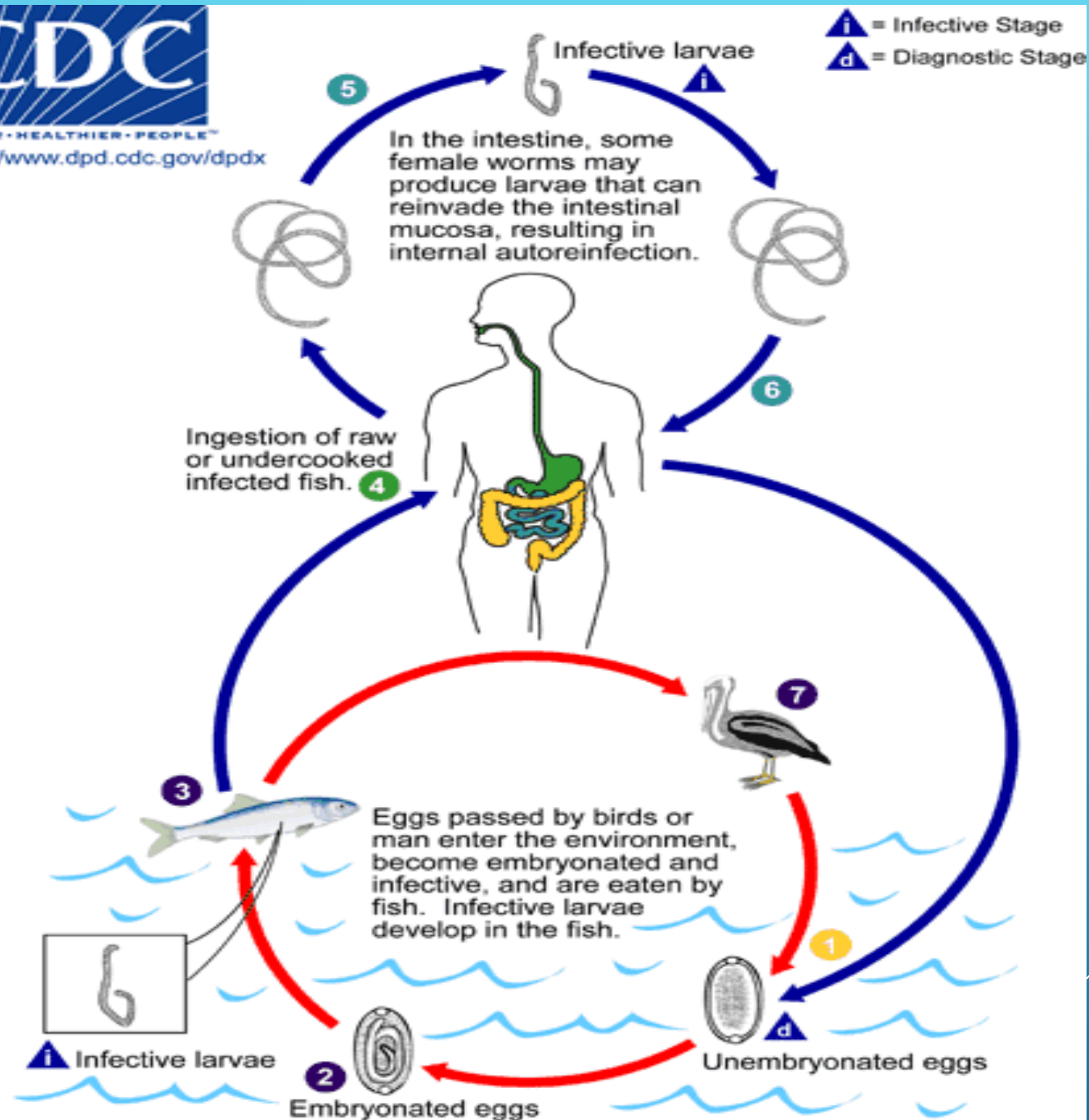


<i>Capillaria philippinensis</i>	
<b>Common Name</b>	NA
<b>Infective Stage</b>	Encysted Larvae
<b>Habitat</b>	Small Intestine
<b>Mode of Transmission</b>	Ingestion of raw/ undercooked contaminated fish
<b>Diagnostic Specimen</b>	Feces



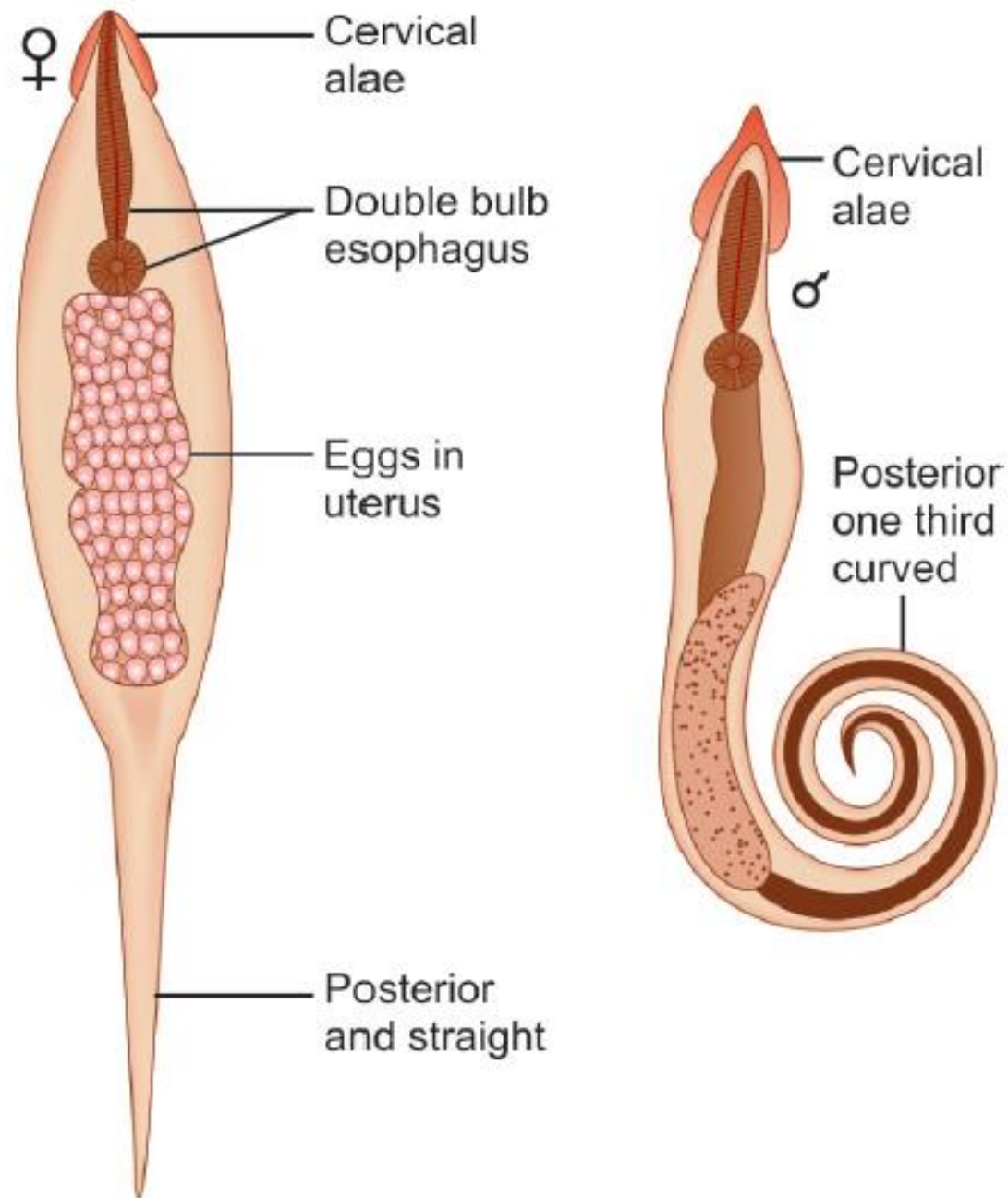


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<http://www.dpd.cdc.gov/dpdx>

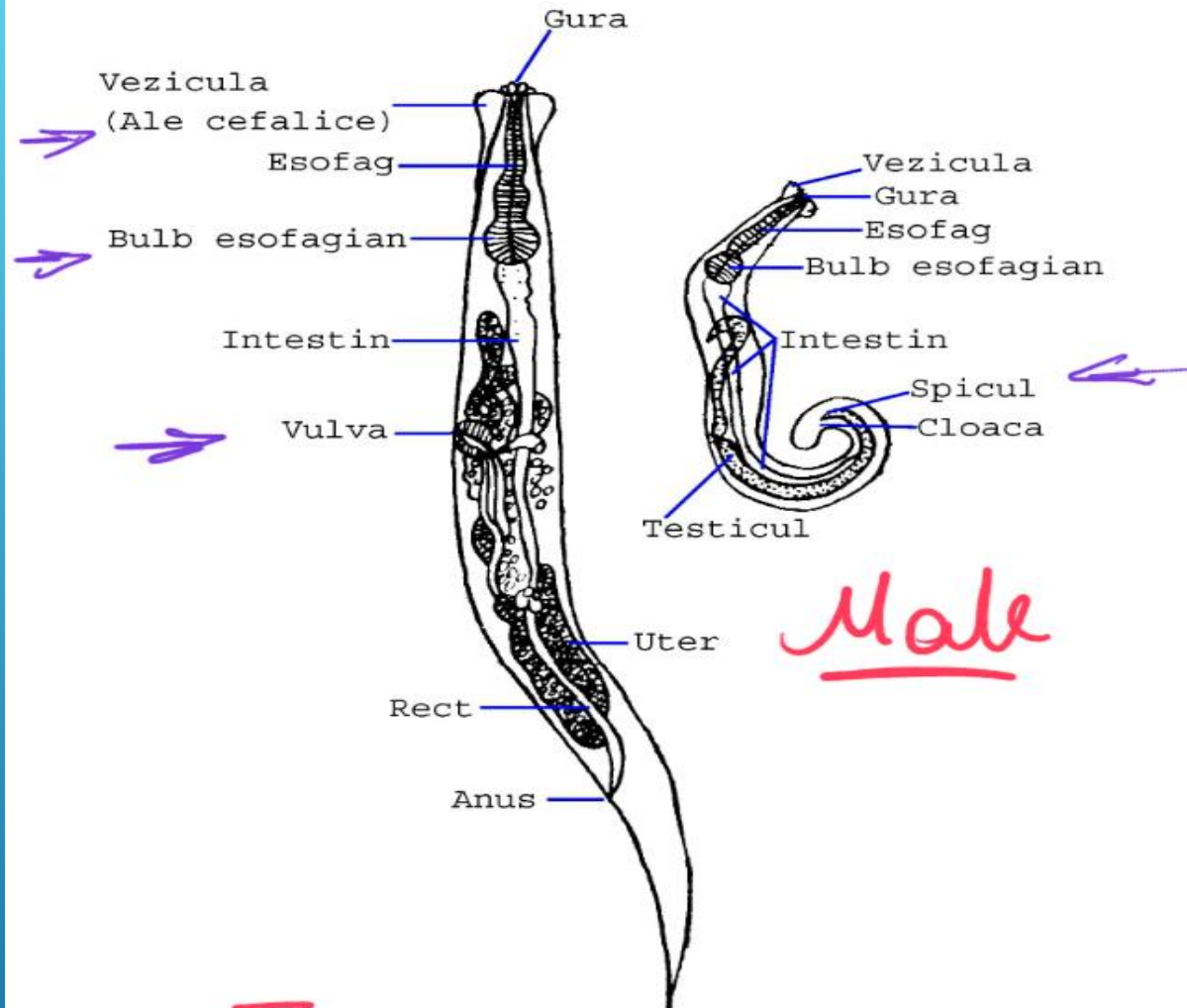




ENTEROBIUS  
VERMECULARIS



**Fig. 19.1:** Adult worm of *Enterobius vermicularis* (male and female)



Male

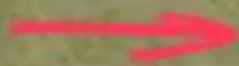
Female

(Enterobius vermicularis)

Slightly flattened

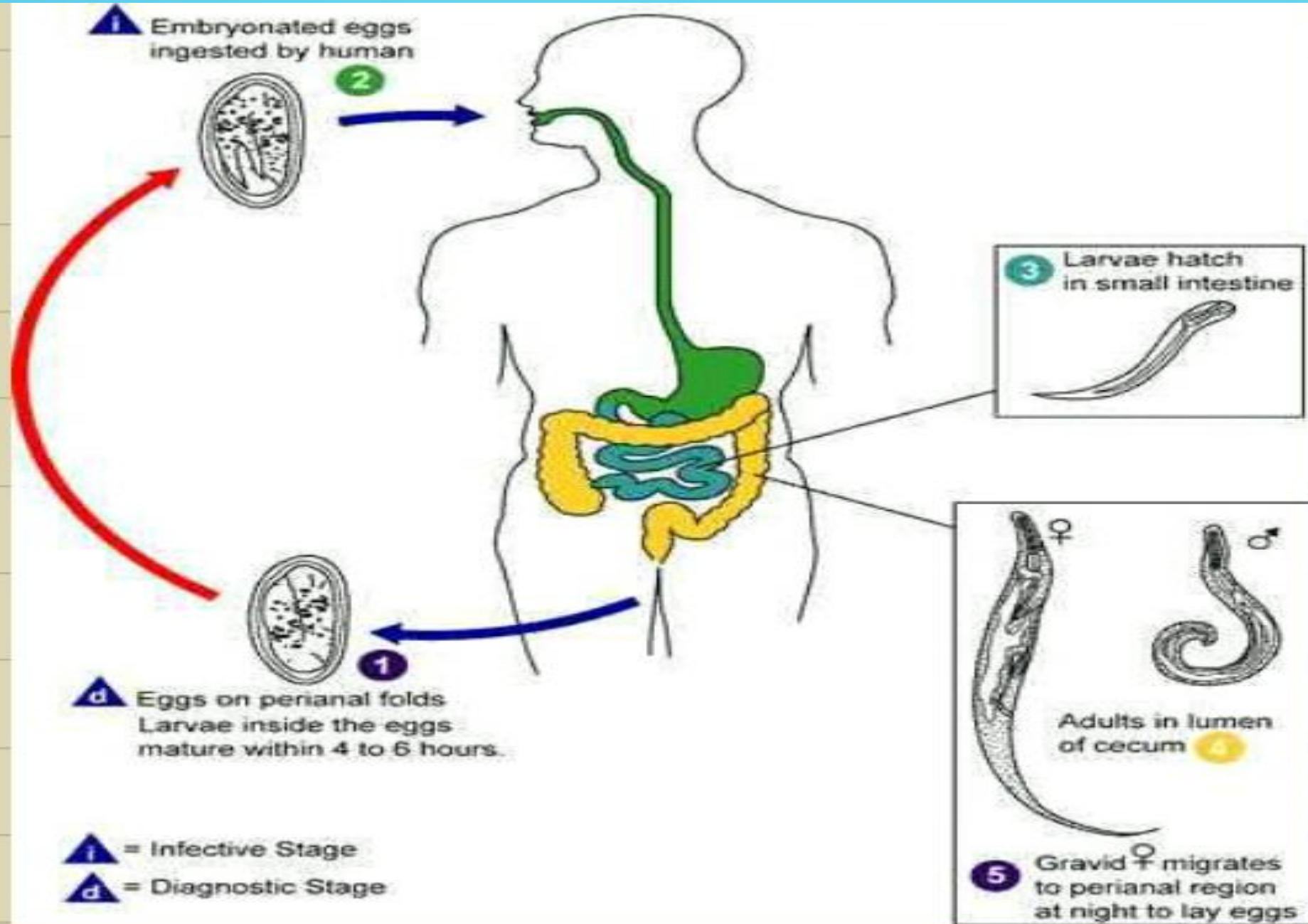


Convex



*Enterobius  
vermicularis egg*





life cycle of enterobius vermicularis

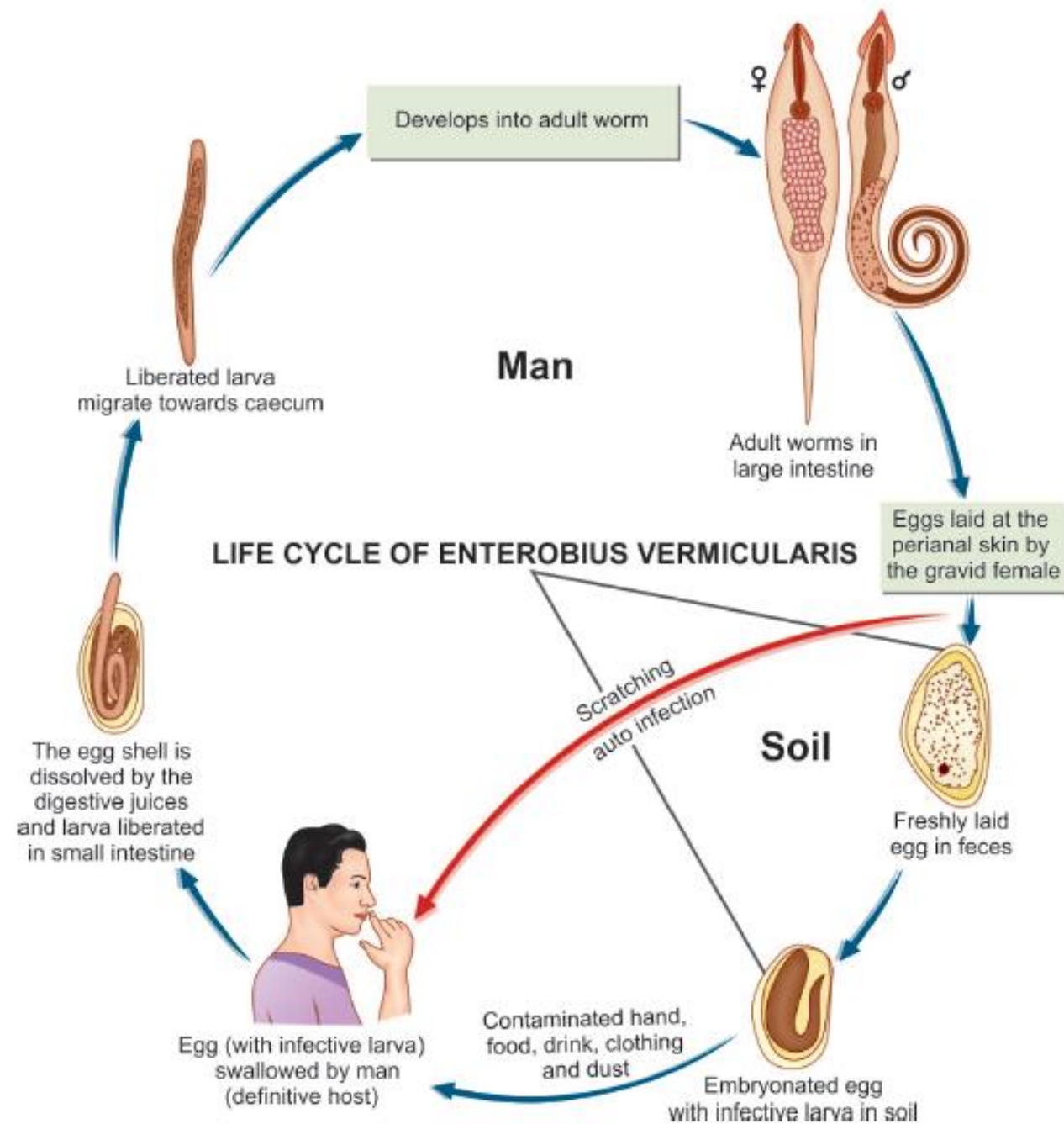
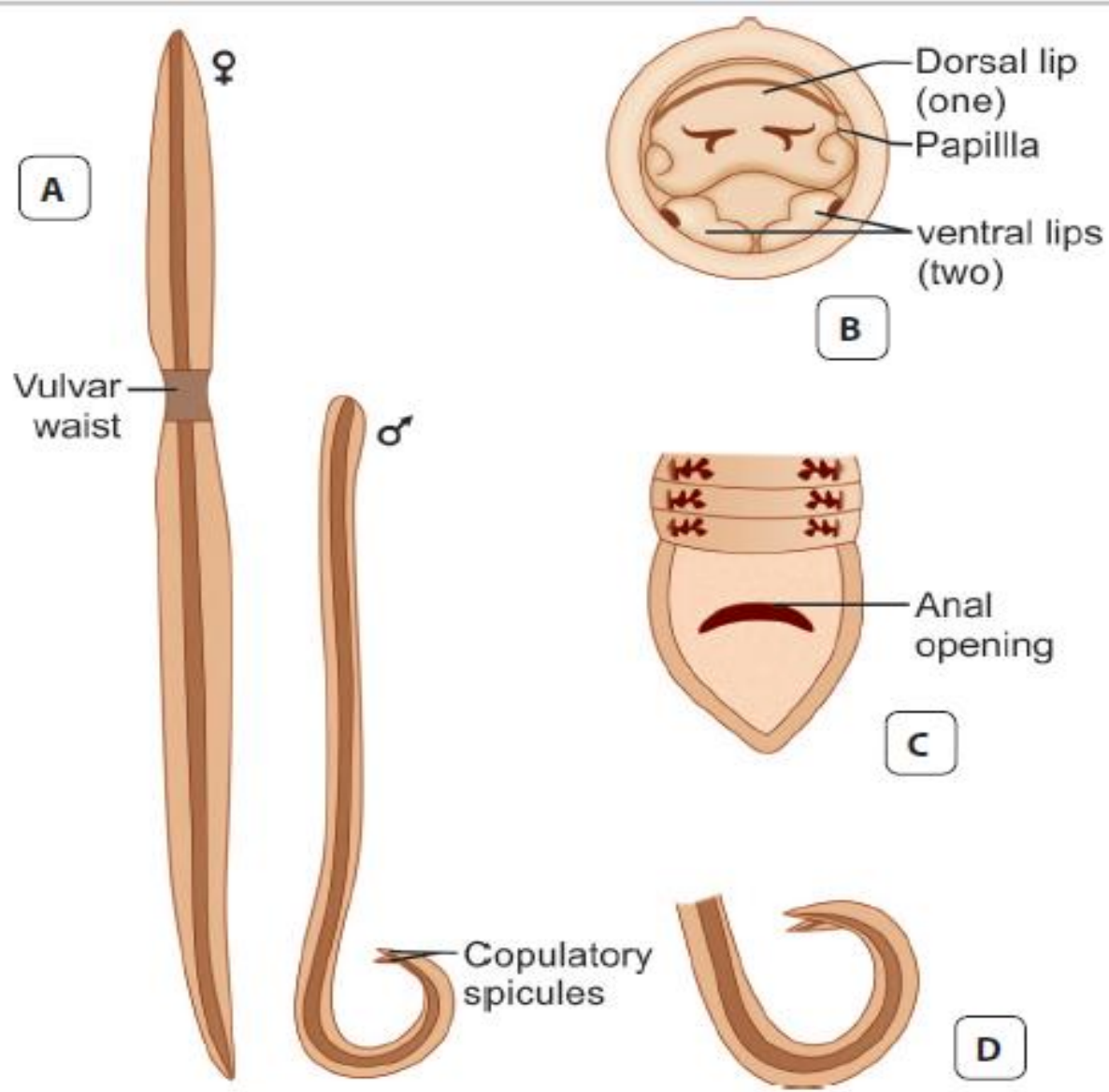


Fig. 19.3: Life cycle of *Enterobius vermicularis*

ASCARIS

LUMBRICOIDES



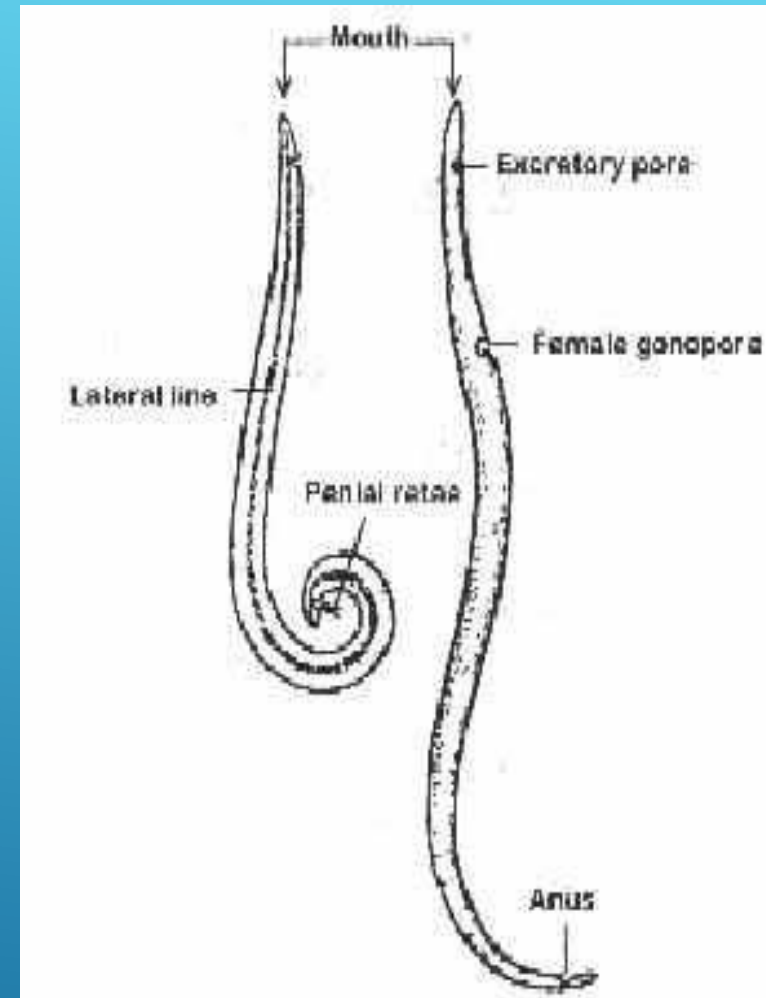
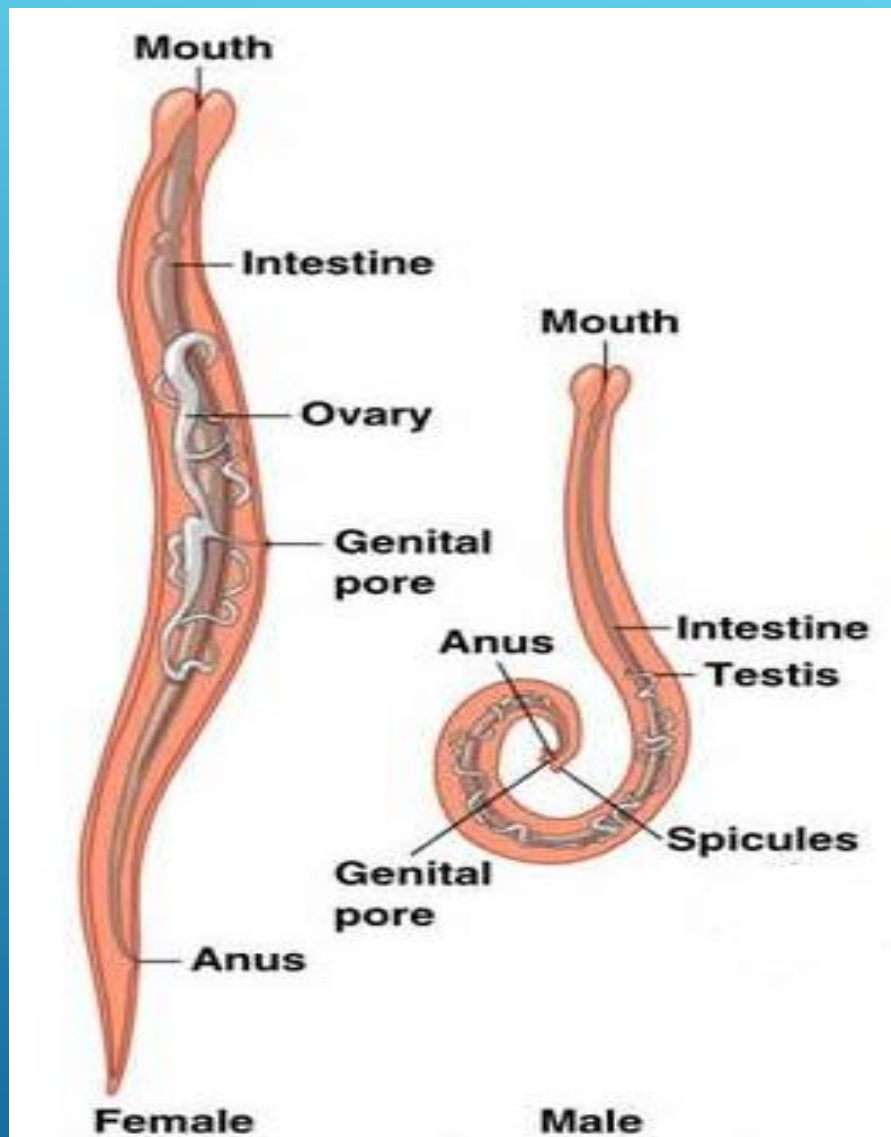


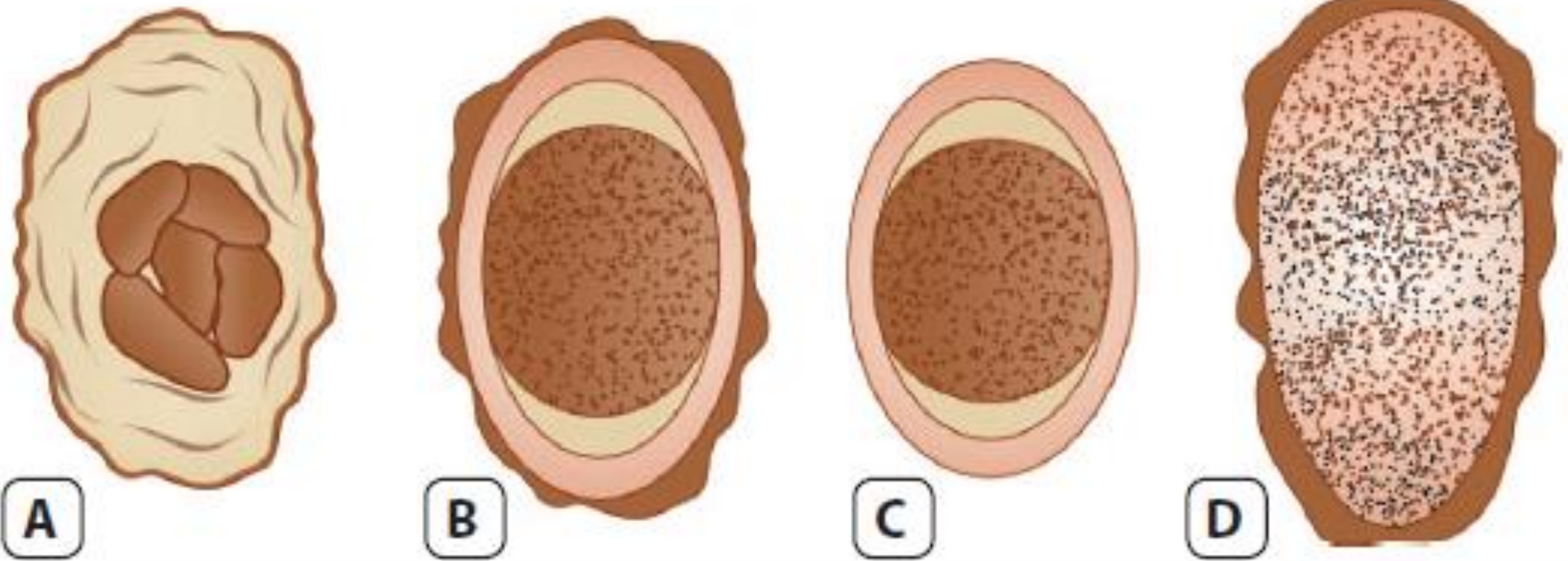
**Fig. 20.2:** *Ascaris lumbricoides*. **A.** Adult female and male worms; **B.** Anterior end of worm. head-on view, showing 1 dorsal and 2 ventral lips with papillae; **C.** Posterior end of female, showing anal opening, a little above the conical tip; **D.** Posterior end of male, showing 2 protruding copulatory spicules(s)



**Fig. 20.1:** Specimen of *Ascaris lumbricoides*

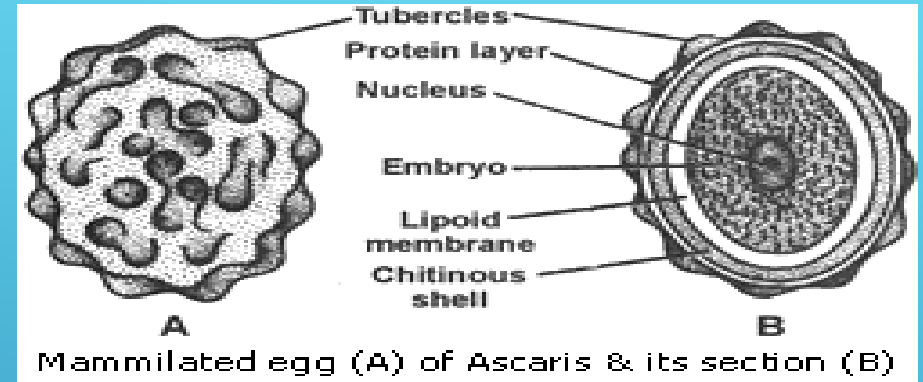






**Fig. 20.3:** Types of *Ascaris* eggs found in stools. **A.** Fertilized egg surface focus, showing outer mamillary coat; **B.** Fertilized egg, median focus, showing unsegmented ovum surrounded by 3 layers of coats; **C.** Decorticated fertilized egg, the mamillary coat is absent; **D.** Unfertilized egg, elongated, with atrophic ovum

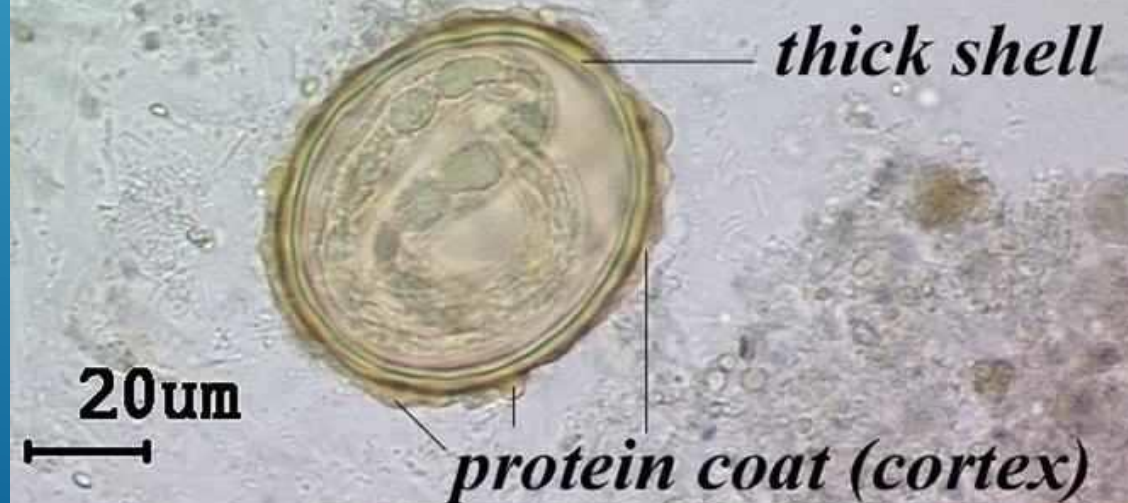




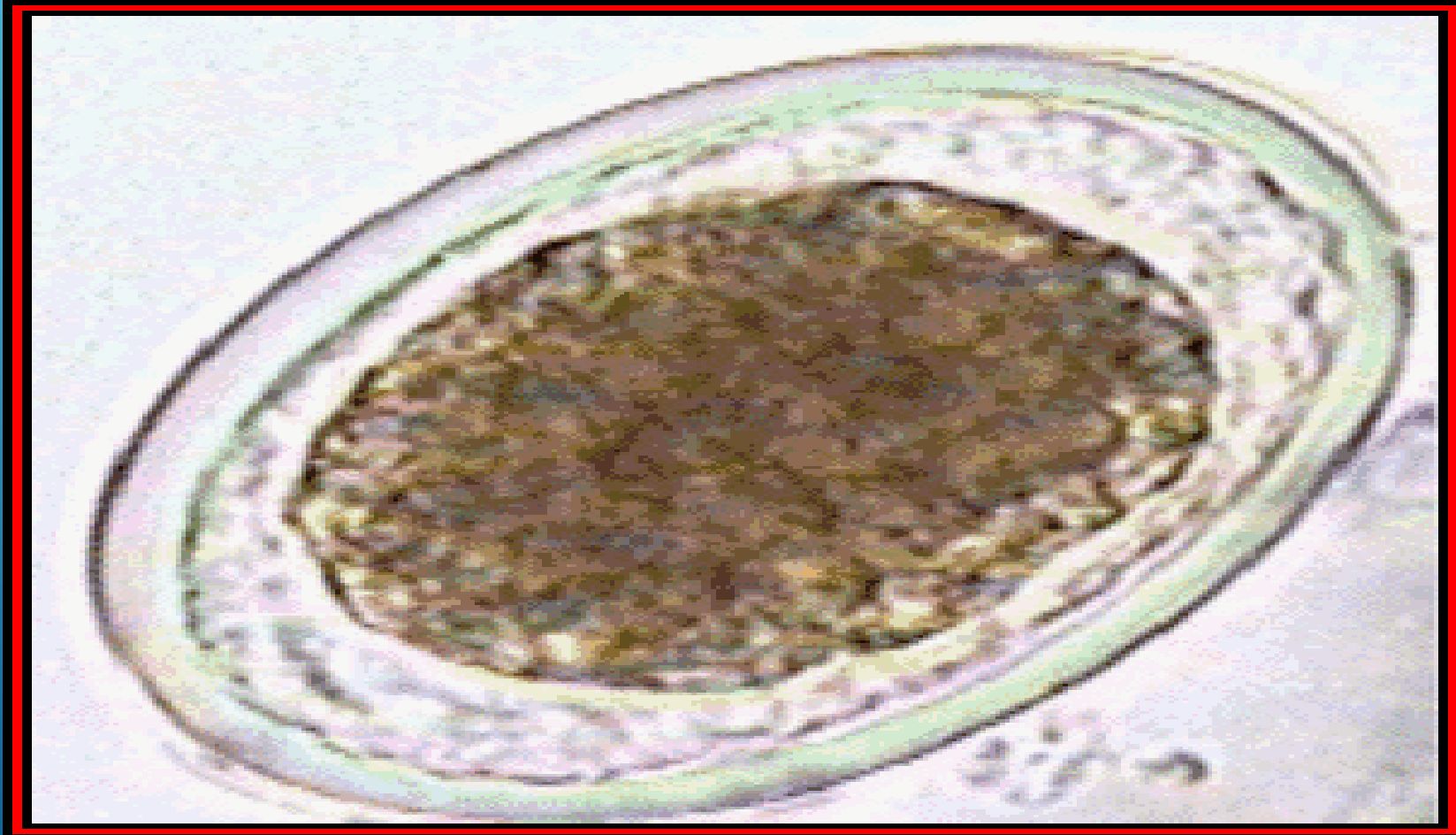
## *Ascaris lumbricoides*



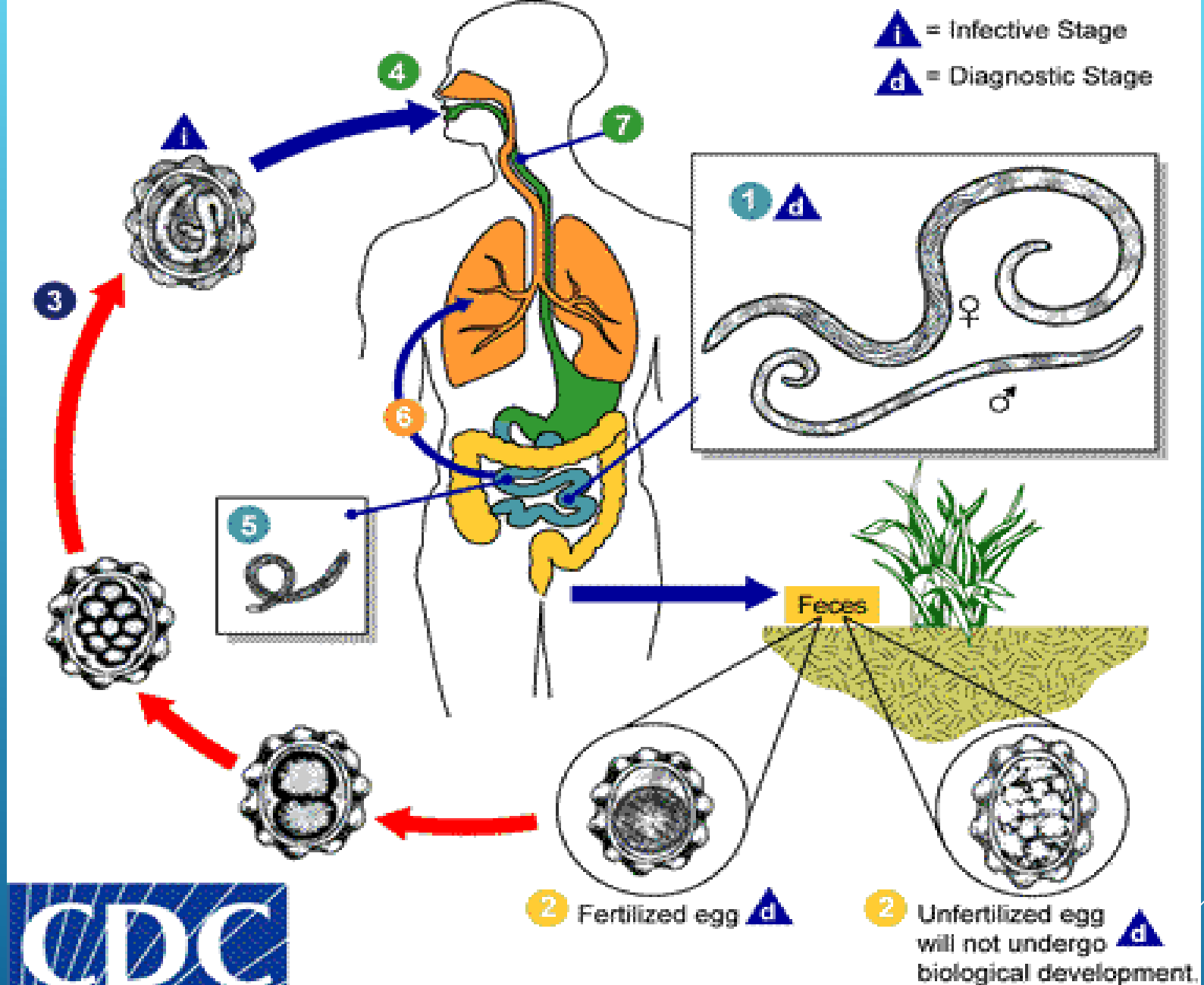
## *Ascaris lumbricoides* fertilised egg



# DECORTICATED EGG

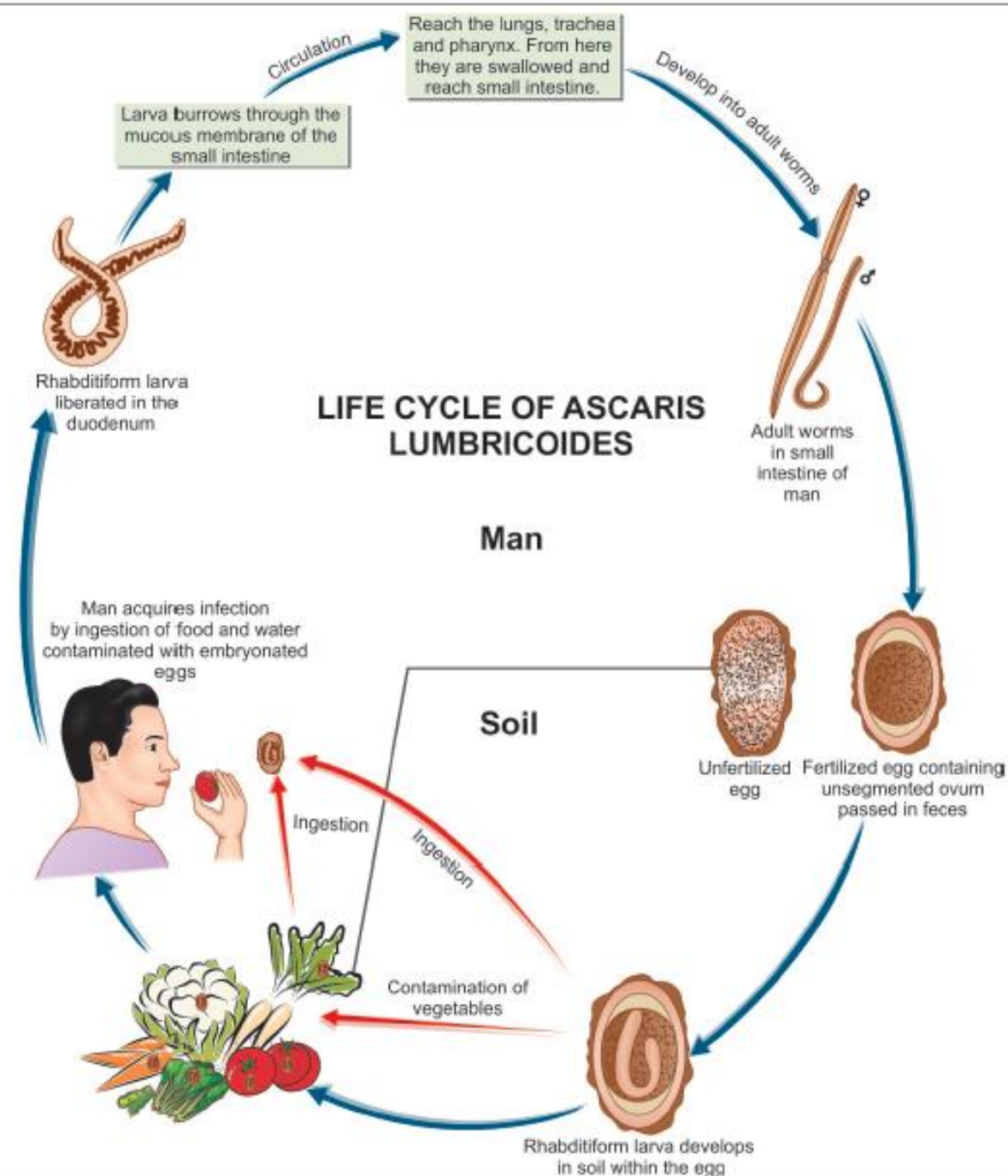






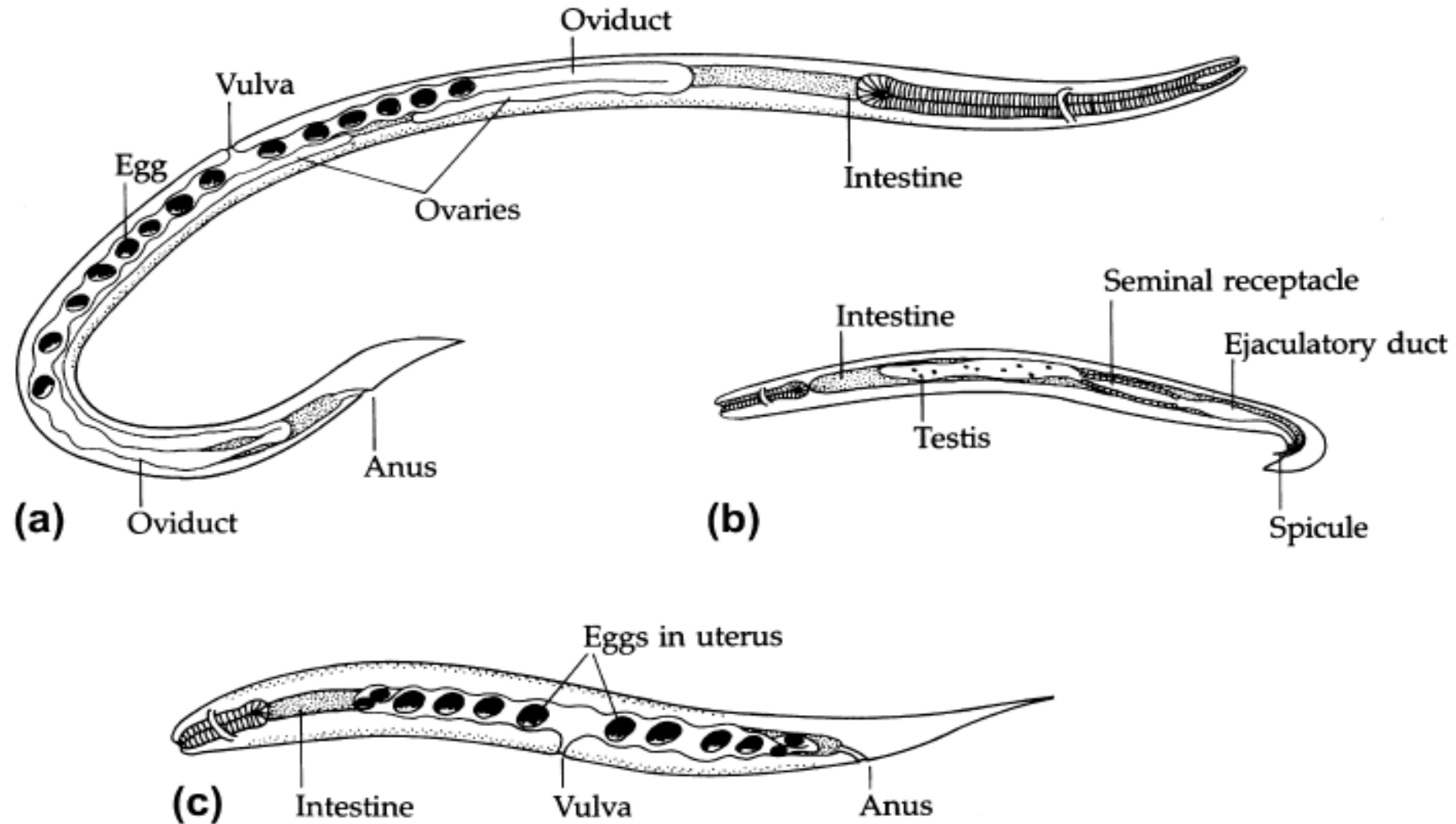
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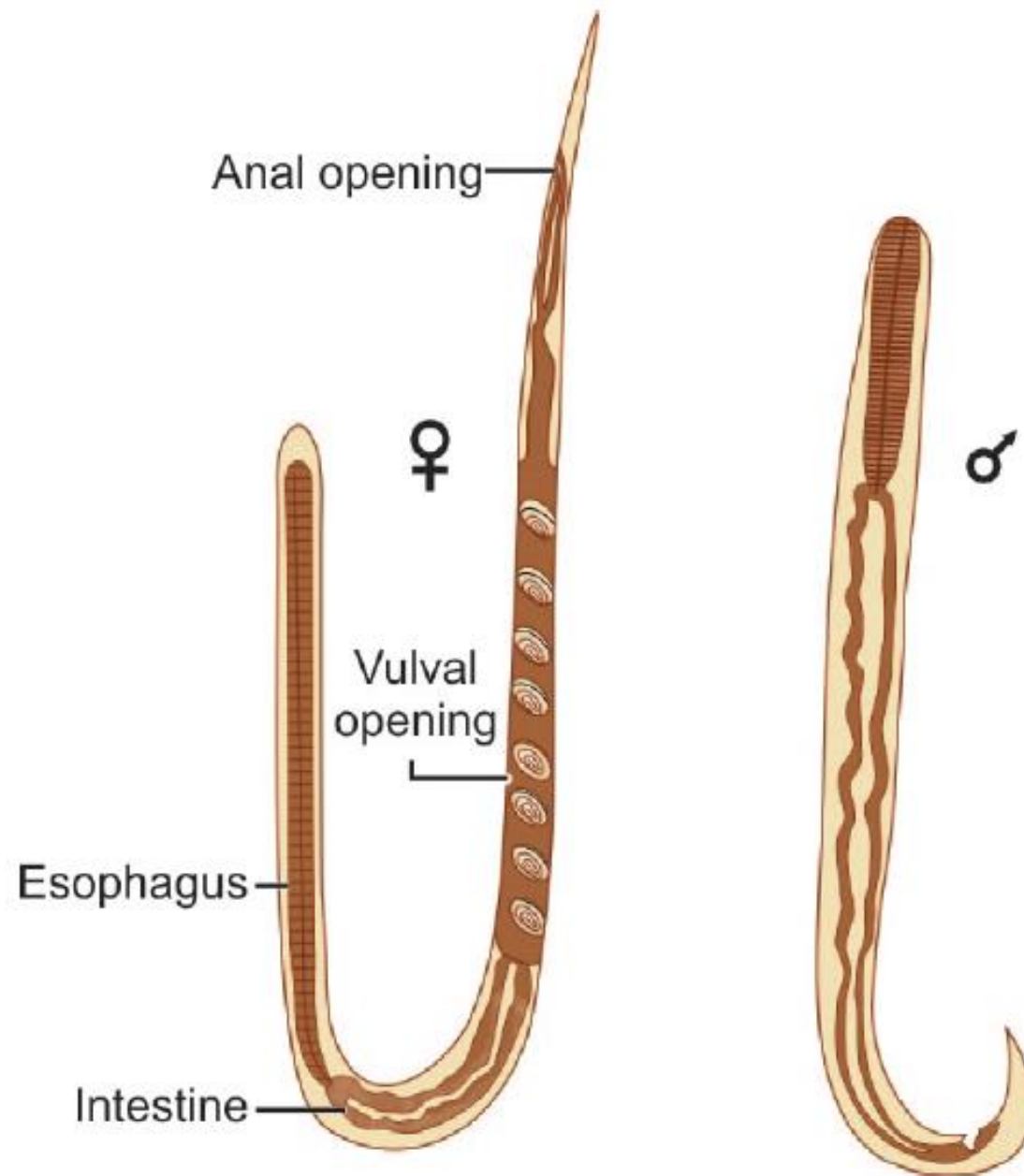
**Fig. 20.5:** Life cycle of *Ascaris lumbricoides*

STRONGYLOIDS  
STEROCORALIS

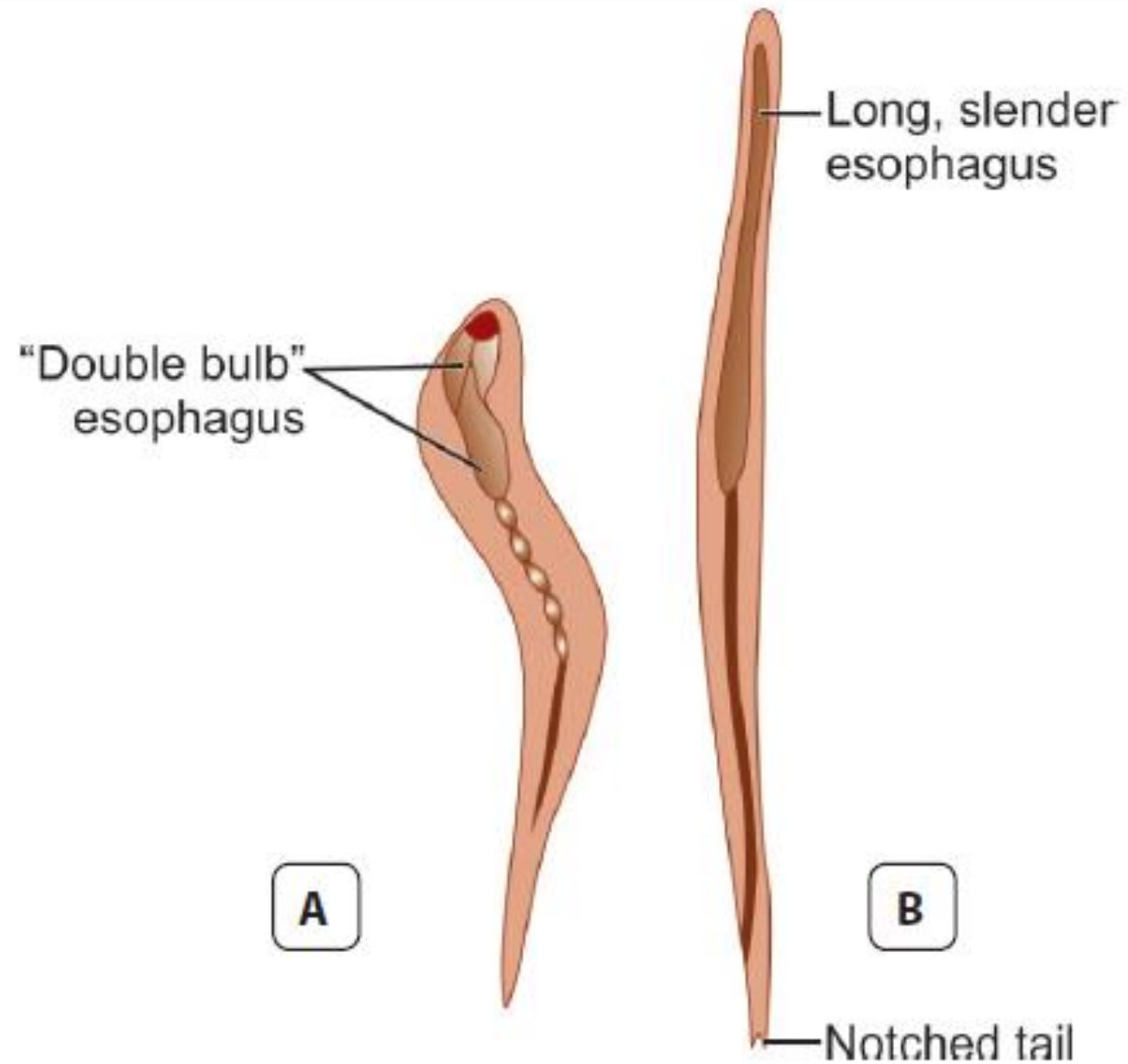


**FIGURE 16-6** Morphology of *Strongyloides stercoralis*. (a) Parasitic female. (b) Free-living male. (c) Free-living female.



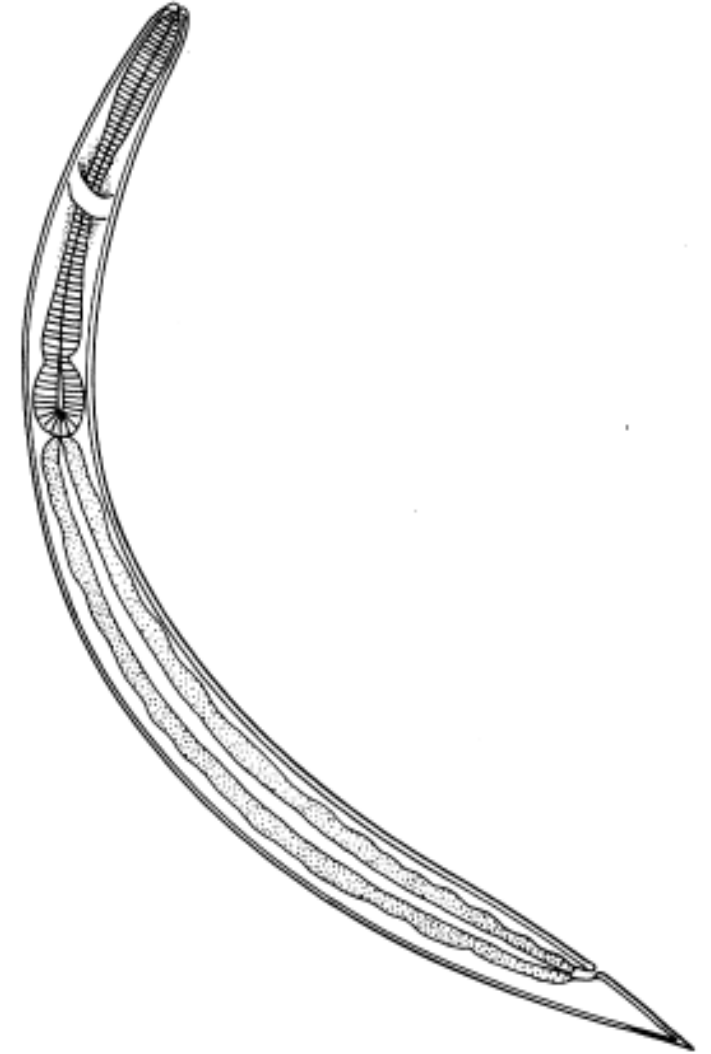
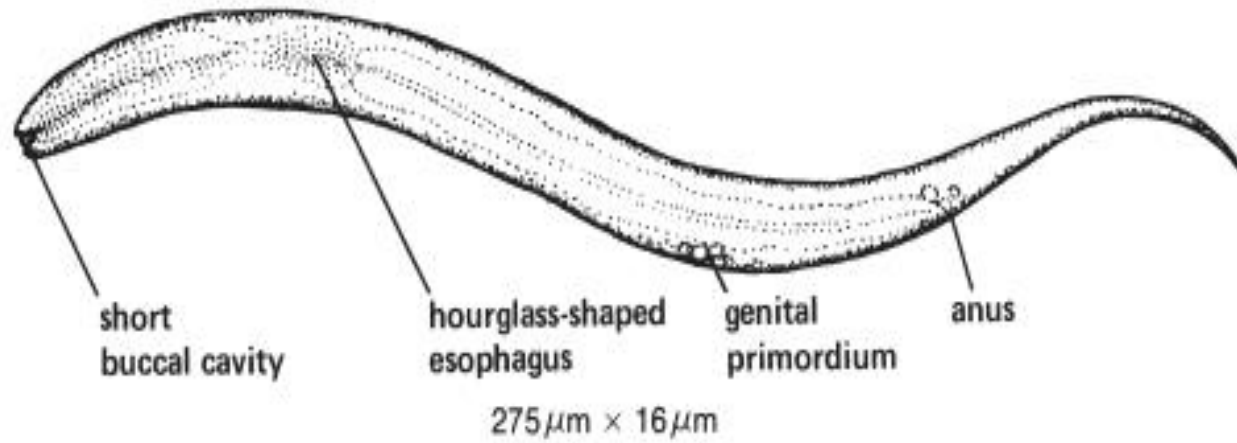


**Fig. 17.1:** Adult worm (male and female)

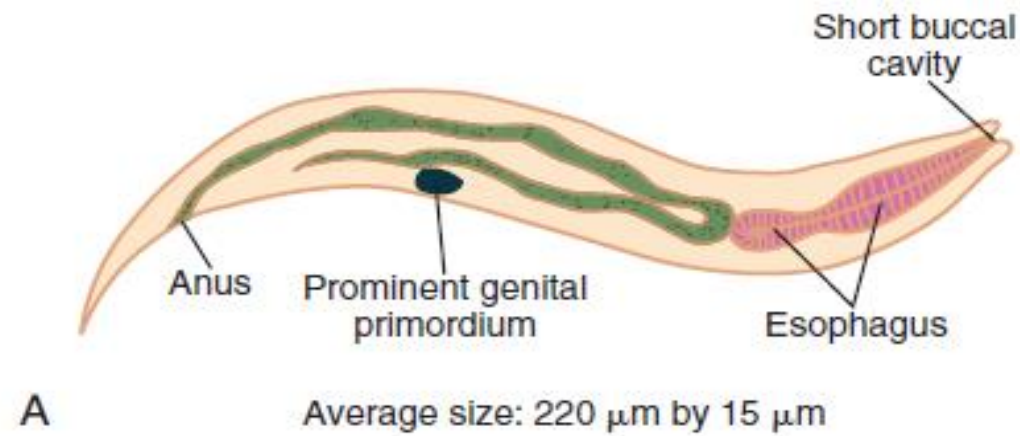


**Fig. 17.3:** Larvae of *Strongyloides stercoralis*. **A.** Rhabditiform larva;  
**B.** Filariform larva

## Diagnostic Stage

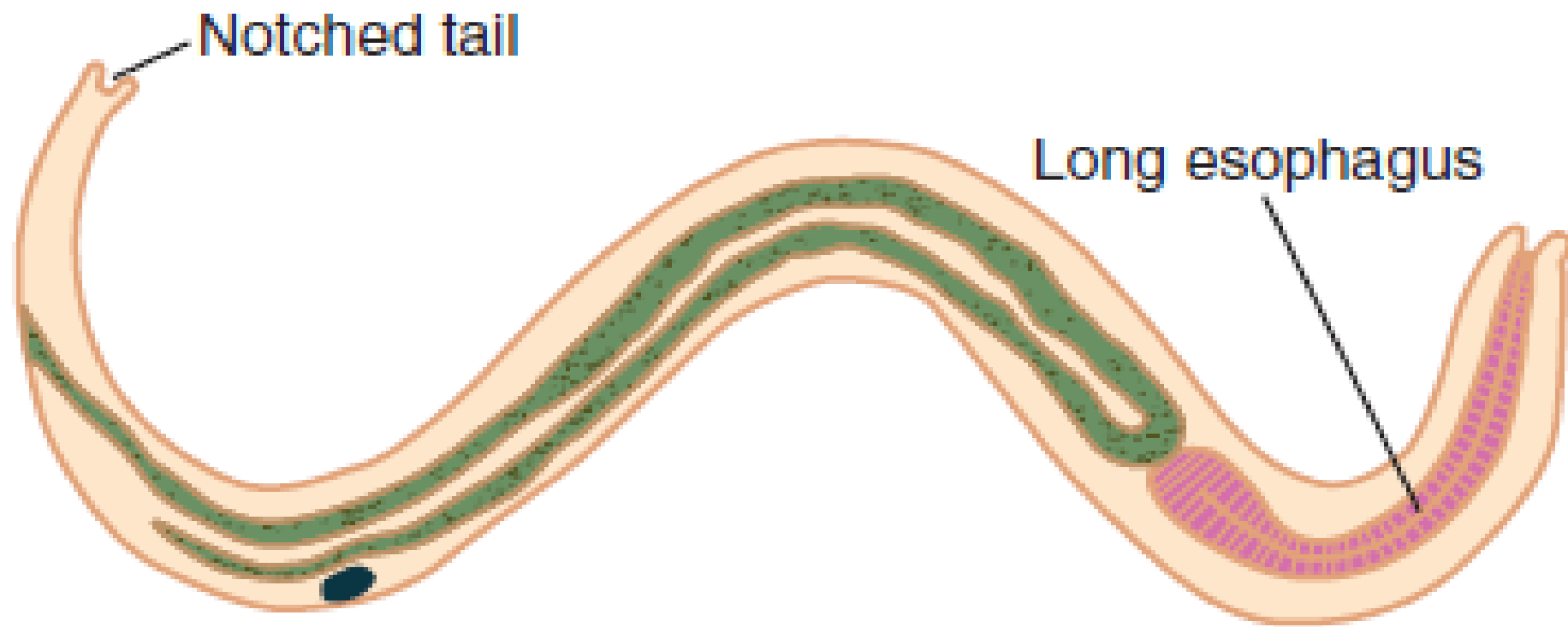


Rhabditiiform larvae. *Strongyloides stercoralis*.



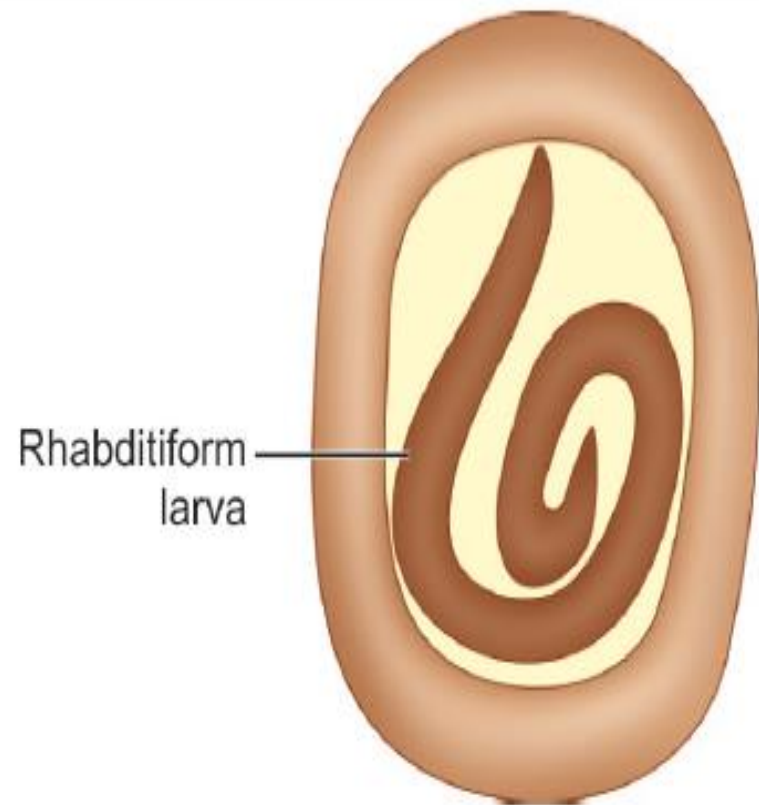
**FIGURE 8-19** A, *Strongyloides stercoralis*, rhabditiform larva. B, *Strongyloides stercoralis*, rhabditiform larva, buccal capsule. C, *Strongyloides stercoralis*, rhabditiform larva. Note the short buccal capsule and prominent genital primordium.



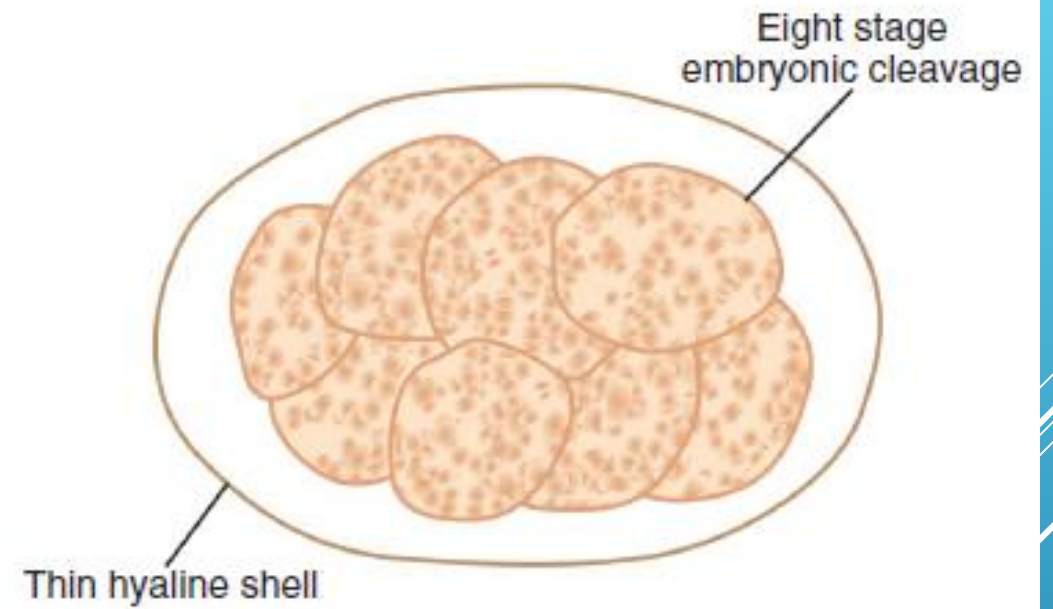


Average length: 690  $\mu\text{m}$

**FIGURE 8-20** *Strongyloides stercoralis*, filariform larva.

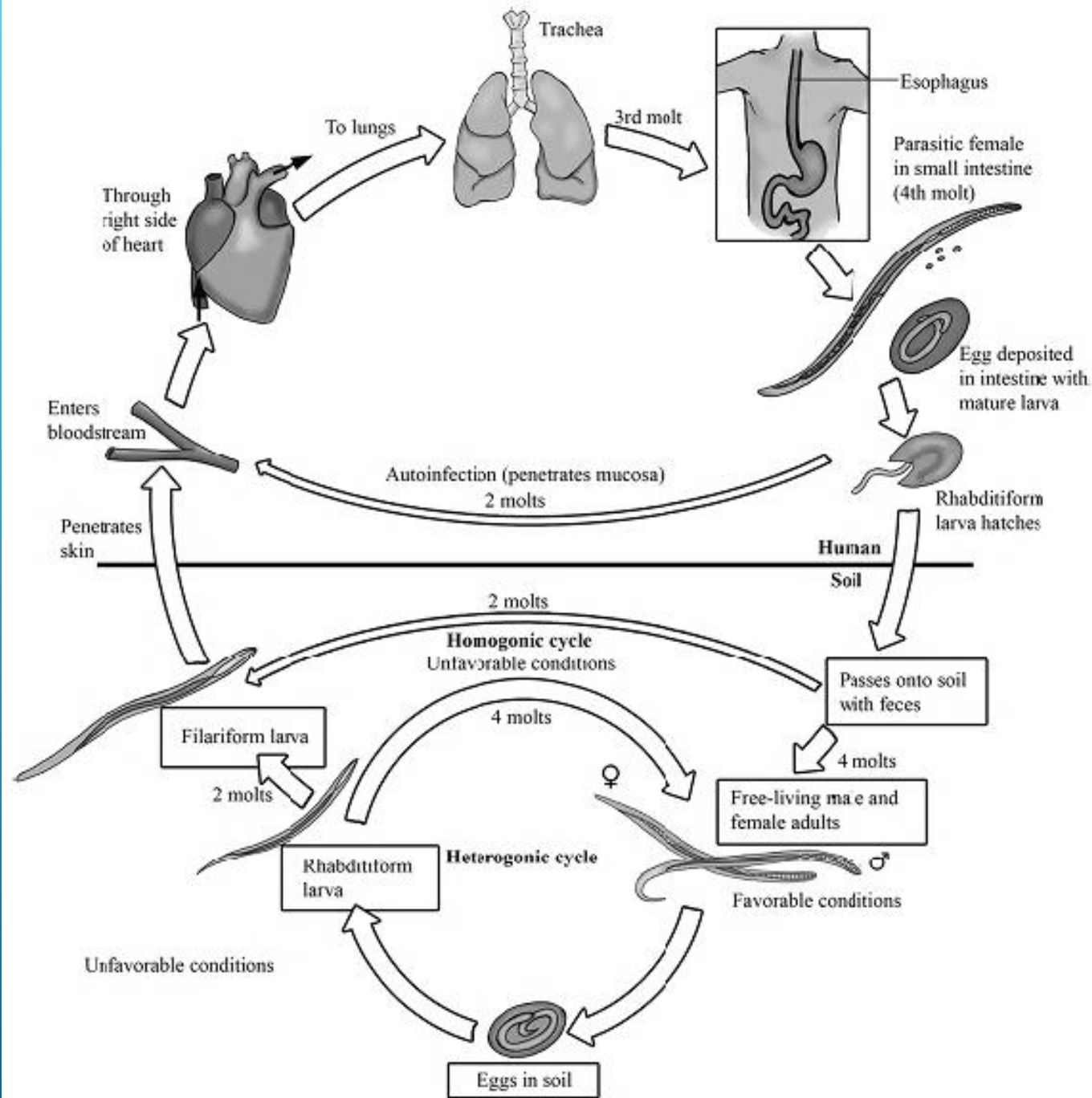


**Fig. 17.2:** Egg of *Strongyloides stercoralis*

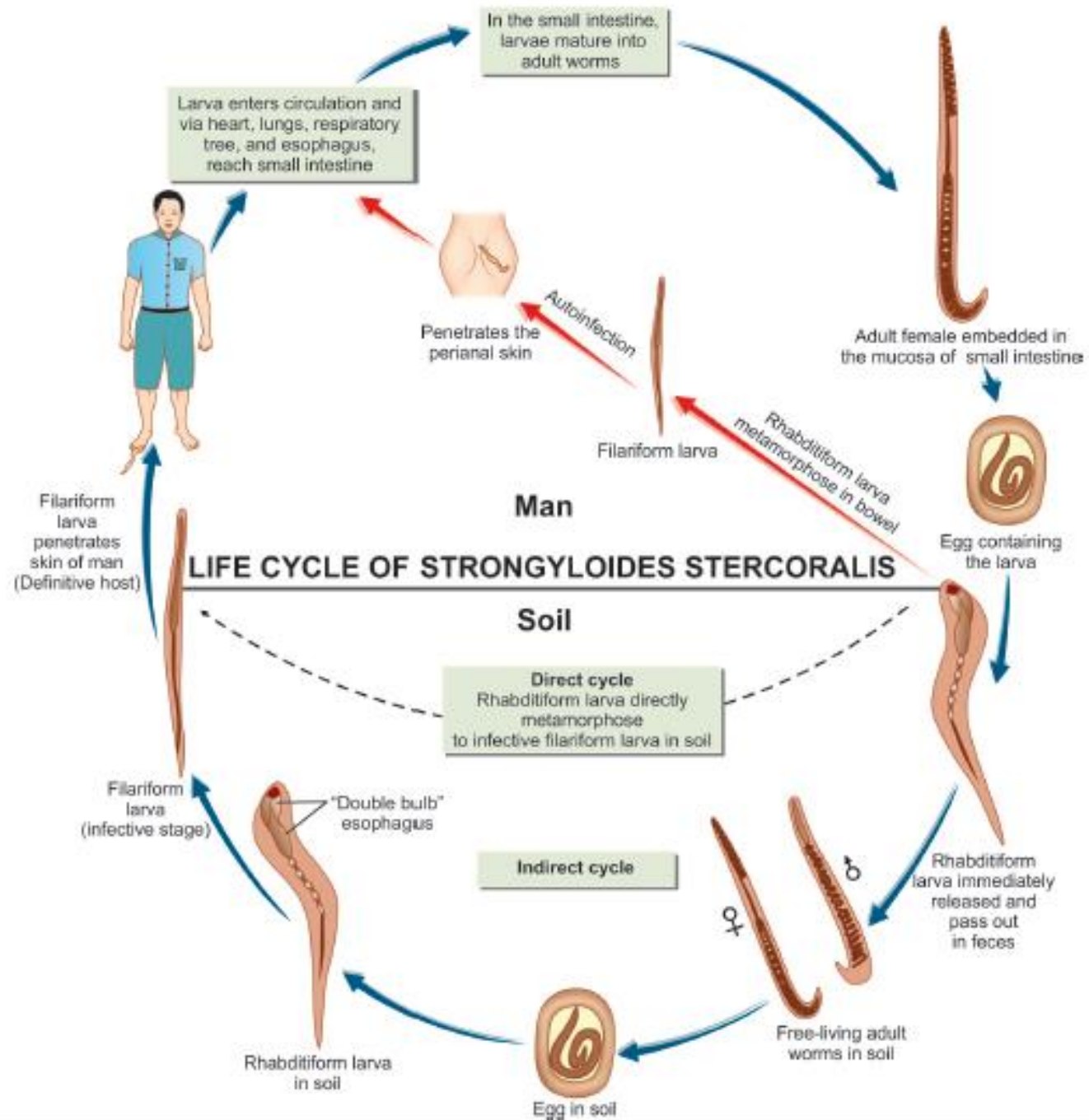


Average size: 48  $\mu\text{m}$  by 35  $\mu\text{m}$

**FIGURE 8-18** *Strongyloides stercoralis* egg.



**FIGURE 16-7** Life cycle of *Strongyloides stercoralis*. Credit: Image courtesy of Gino Barzizza.

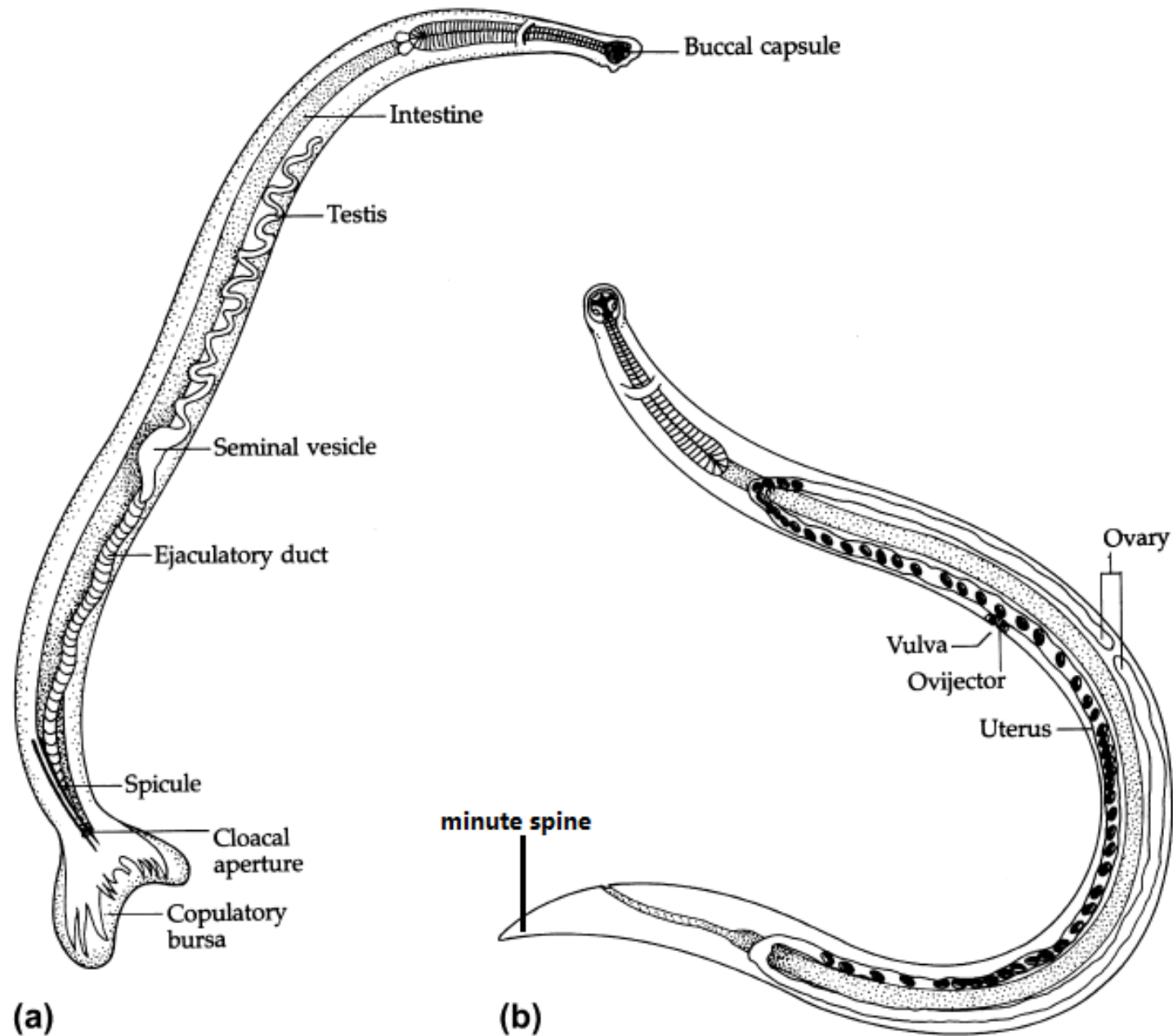


**Fig. 17.4:** Life cycle of *Strongyloides stercoralis*

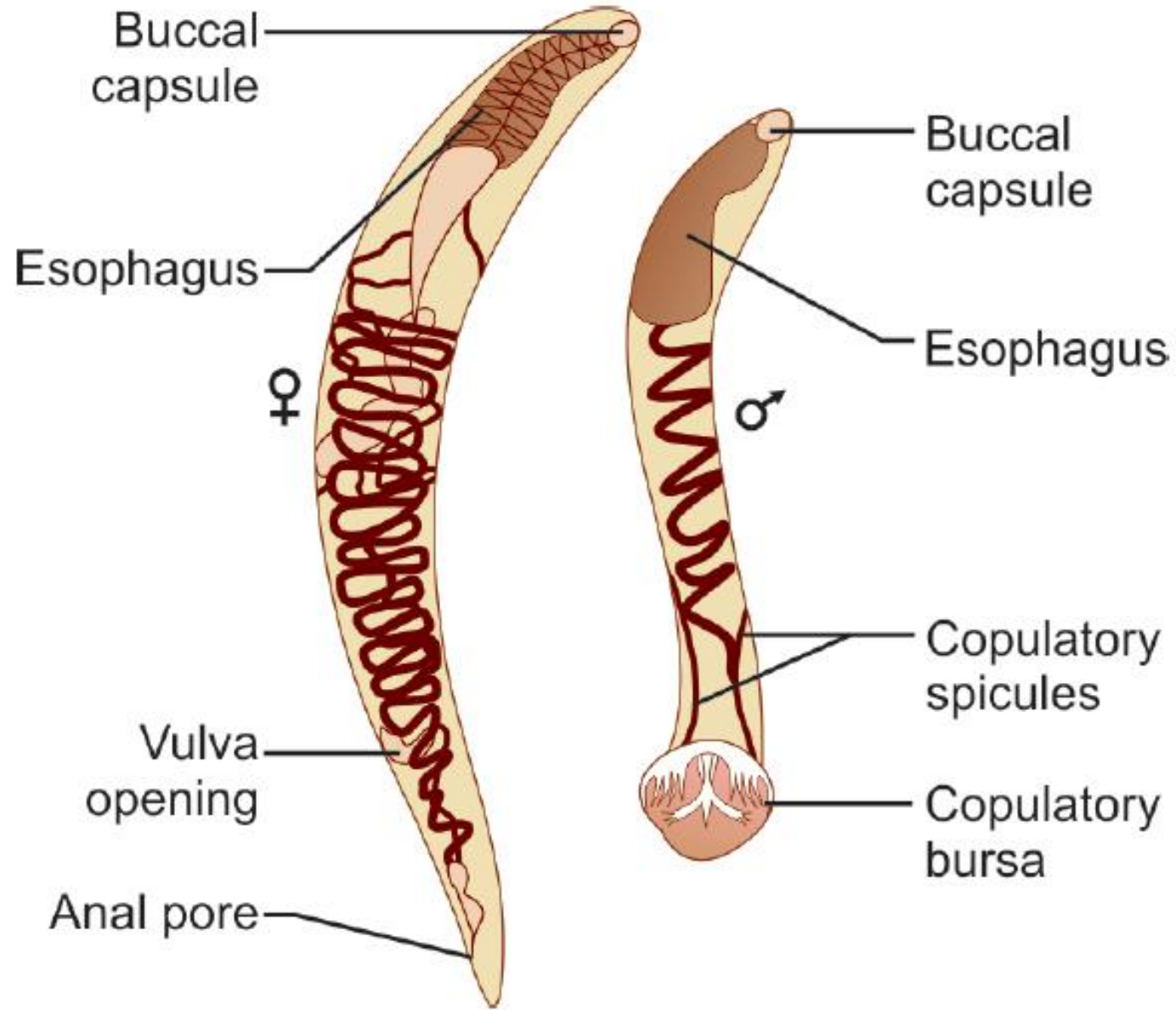


# ANCYLOSTOMA DUODENALE

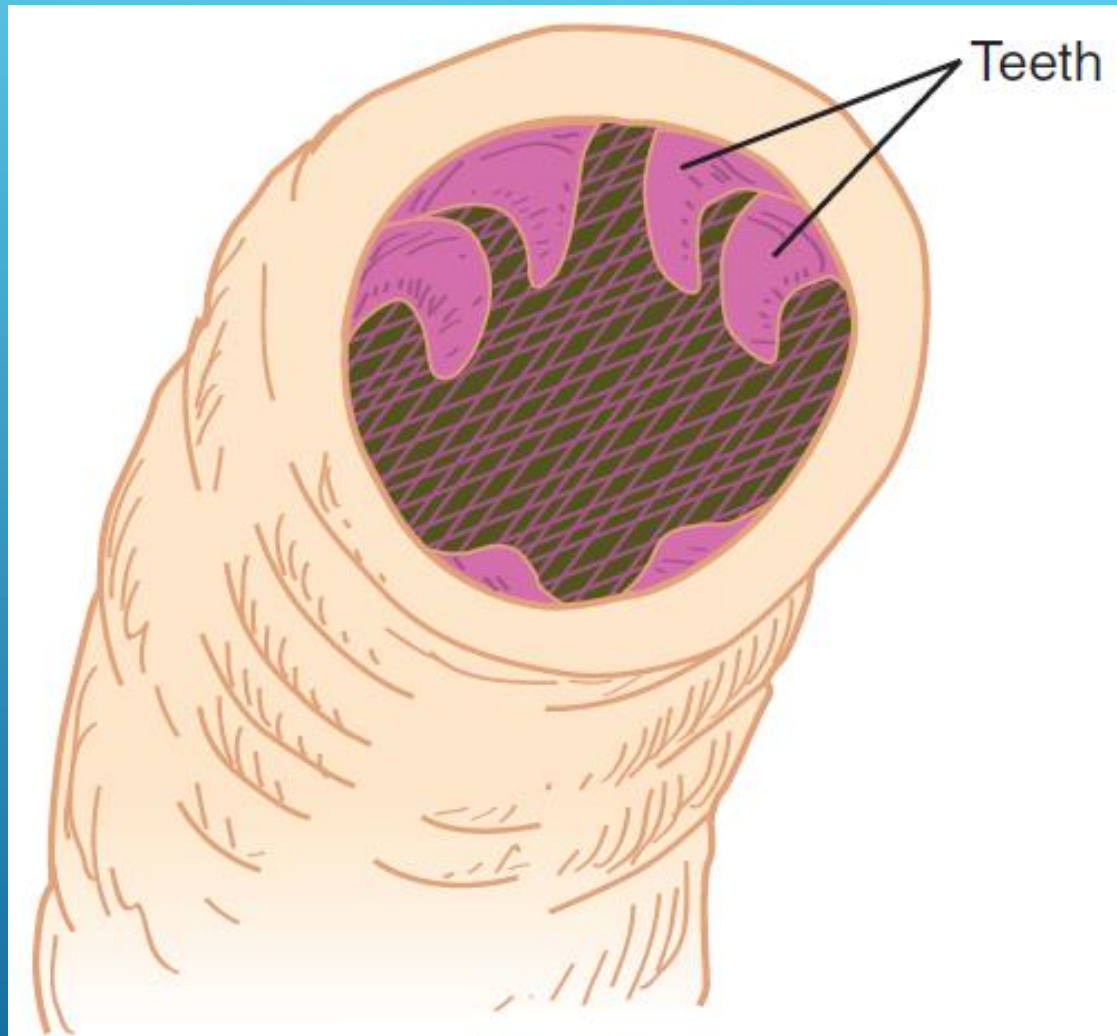
Three parallel white diagonal lines are located in the bottom right corner of the image, extending from the right edge towards the center.



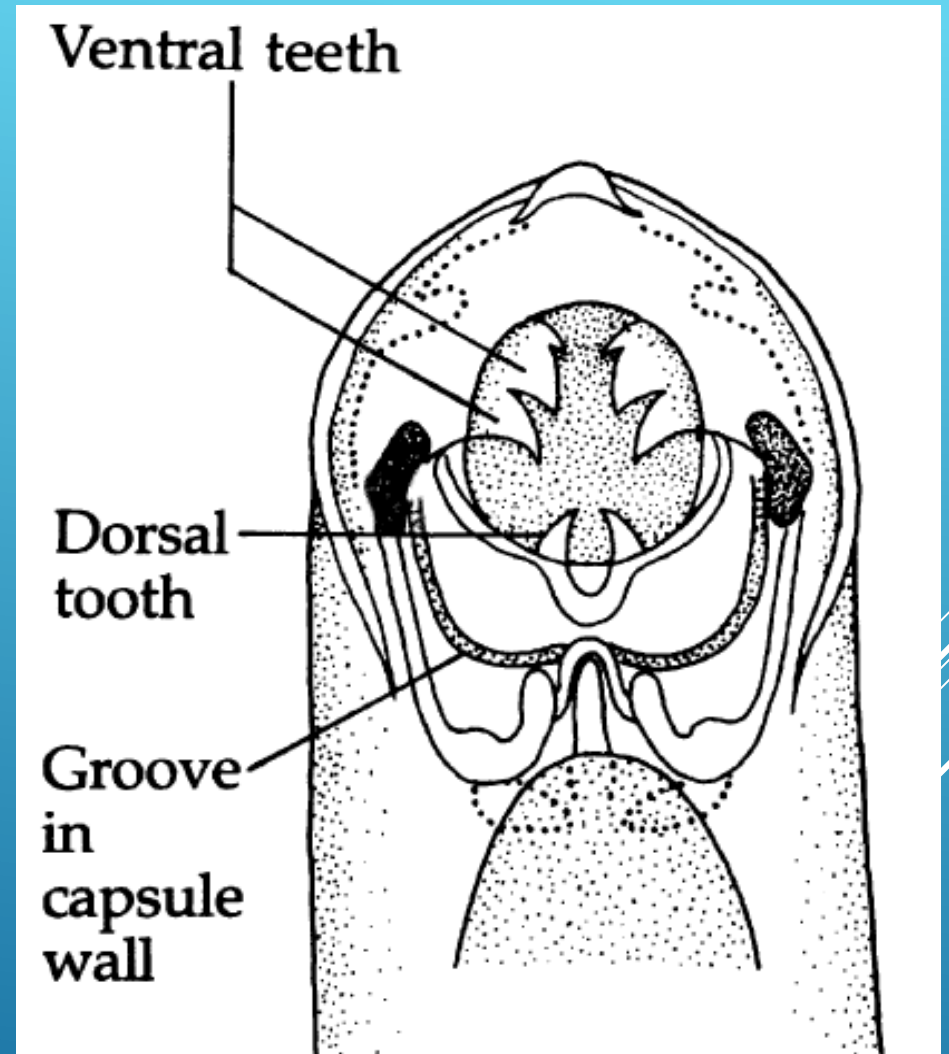
**FIGURE 16-10** Morphology of adult hookworms. Male. (b) Female.



Adult worm of *Ancylostoma duodenale* (male and female)



**ANCYLOSTOMA DUODENALE, BUCCAL CAPSULE**



**ANCYLOSTOMA BUCCAL CAPSULE**

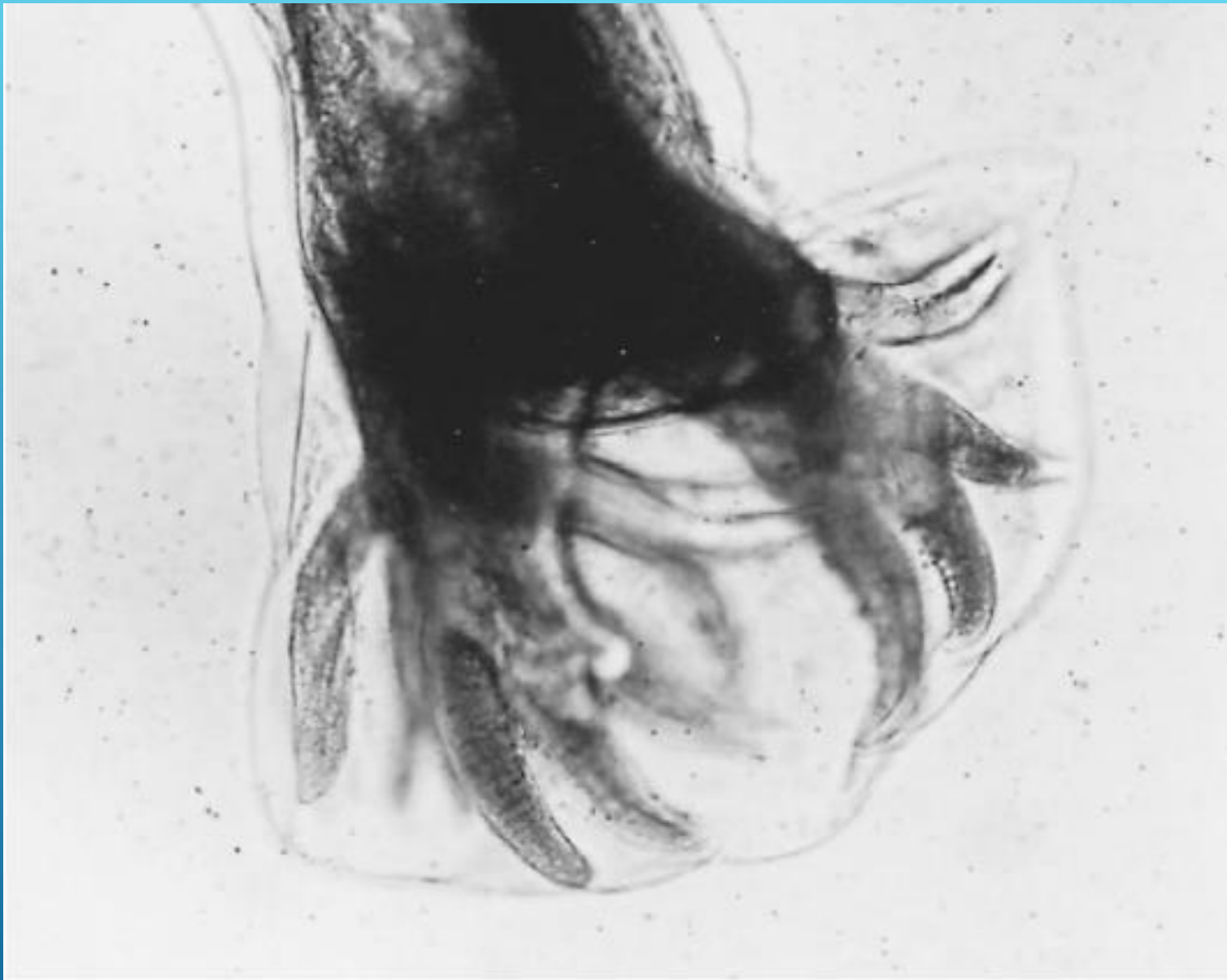




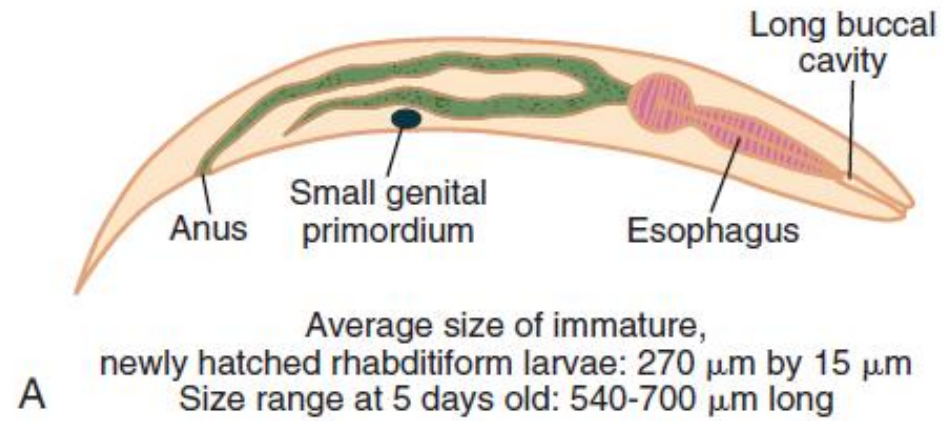
Scanning electron micrograph of *Ancylostoma duodenale* buccal area.



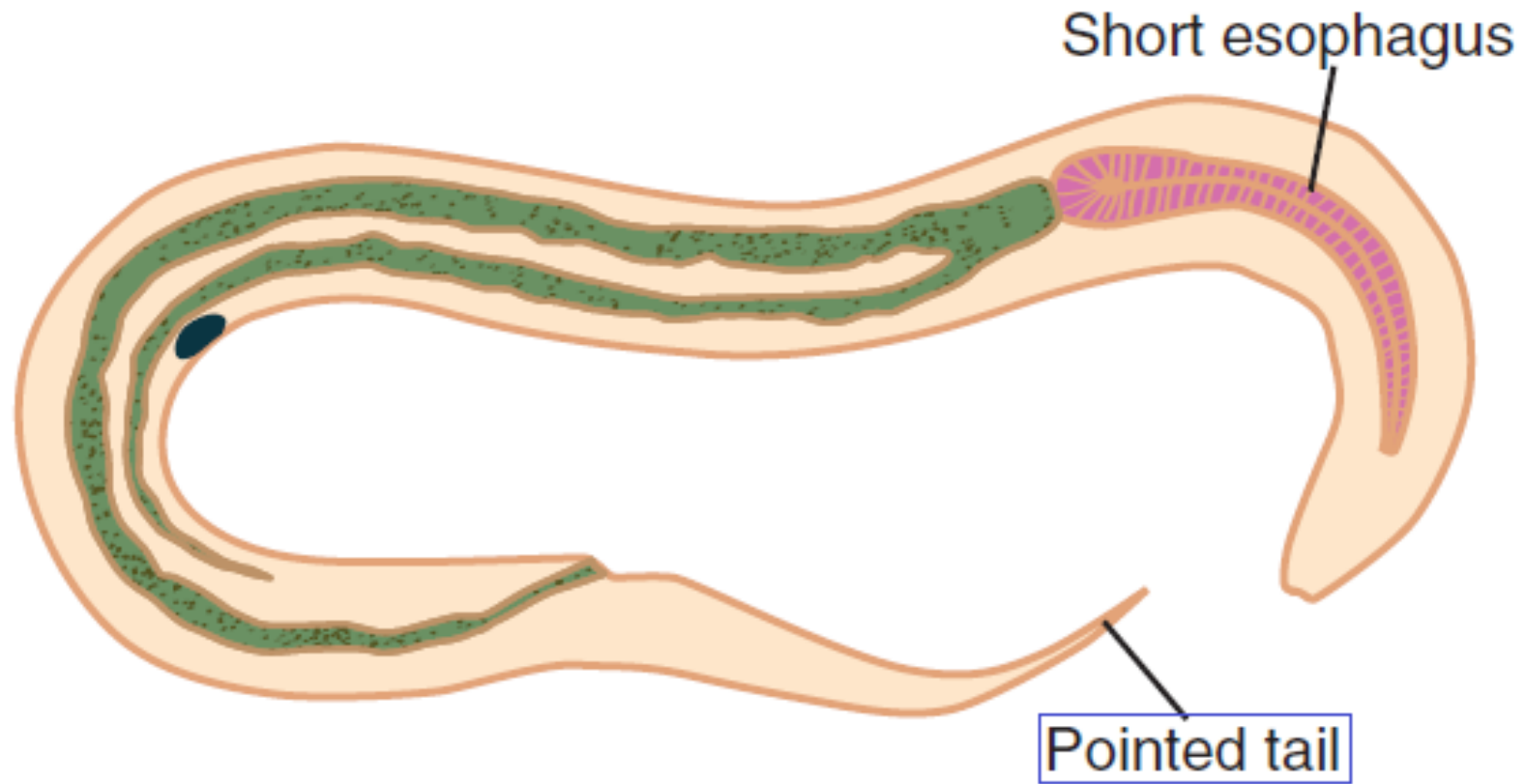
**Figure 25.8** *Ancylostoma duodenale*, dorsal view.  
Notice the powerful ventral teeth.



**COPULATORY BURSA OF MALE HOOKWORM**

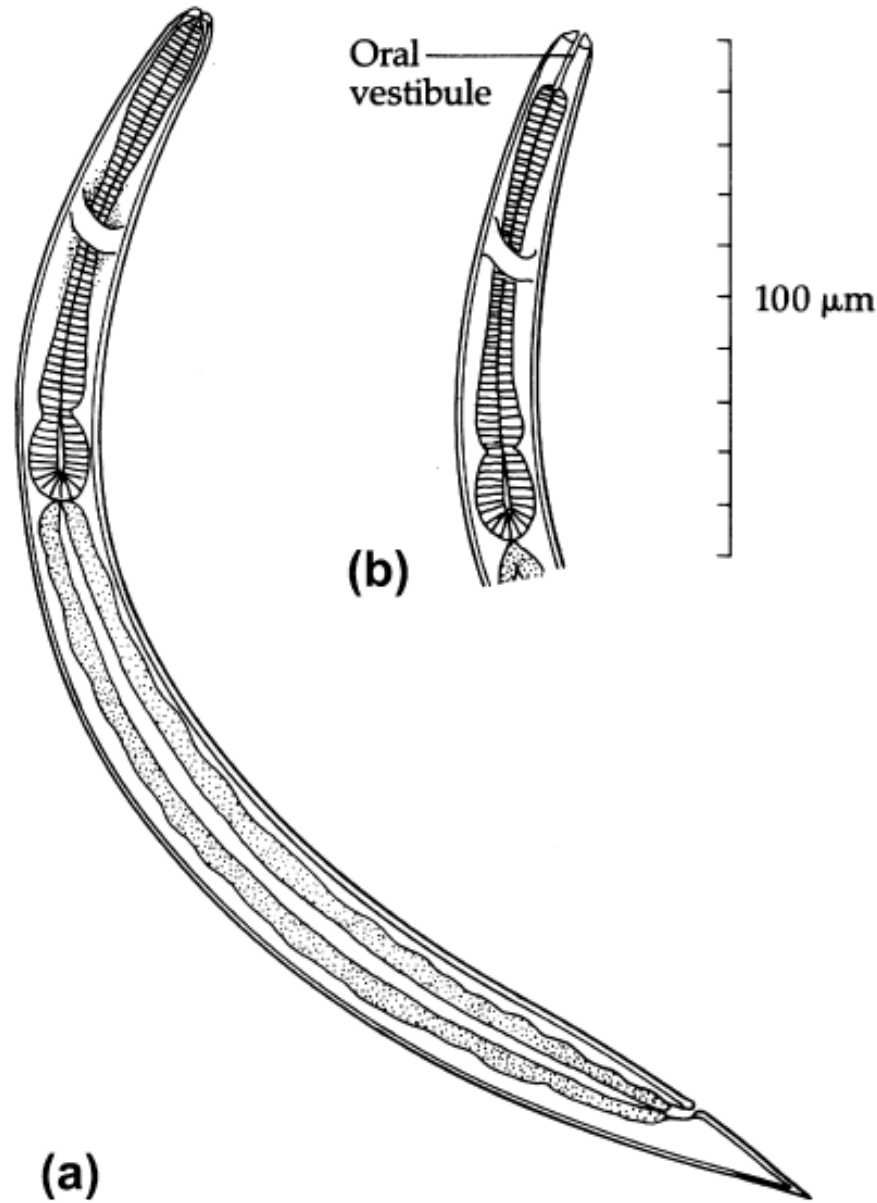


**FIGURE** ➡ **A**, Hookworm rhabditiform larva. **B**, Hookworm rhabditiform larva. Note long buccal capsule and lack of prominent genital primordium. **C**, Hookworm rhabditiform, larval form buccal capsule. (**B**, **C** from Mahon CR,

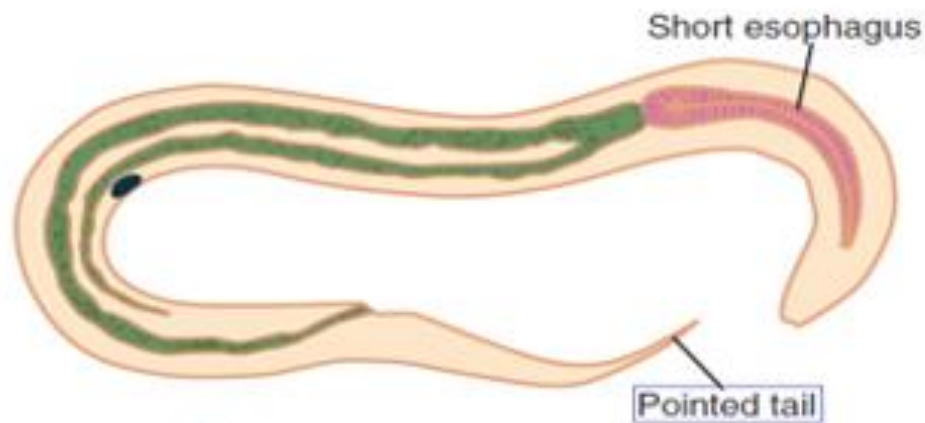


**HOOKWORM FILARIFORM LARVA**

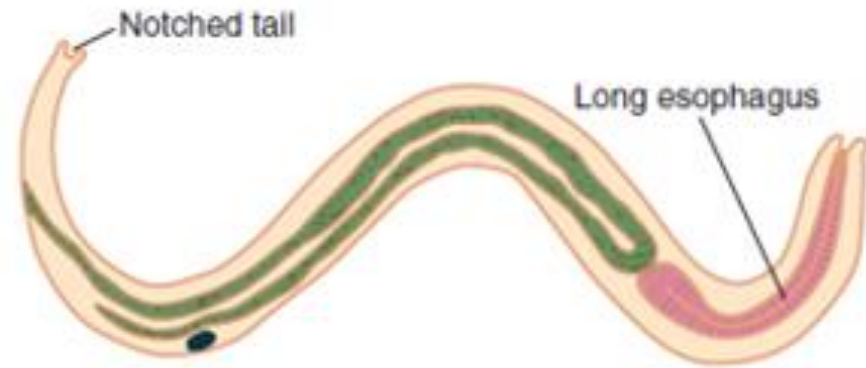




Rhabditiform larvae. (a) *Strongyloides stercoralis*. (b) Anterior portion of hookworm. Note the elongated oral vestibule.



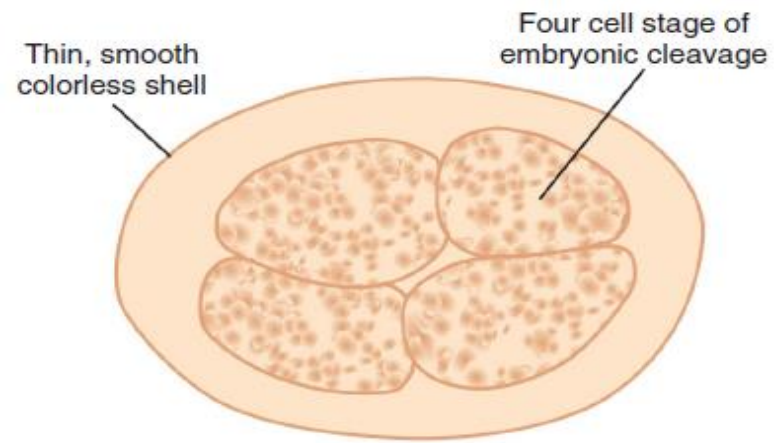
**HOO KWORM FILARIFORM LARVA**



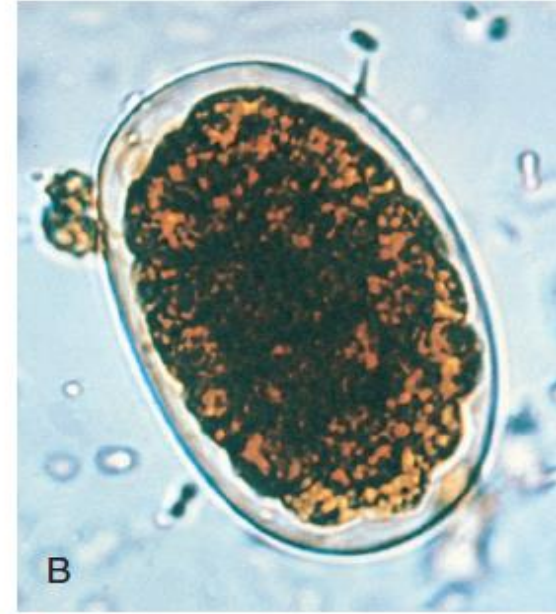
Average length: 690  $\mu\text{m}$

**FIGURE 8-20** *Strongyloides stercoralis*, filariform larva.

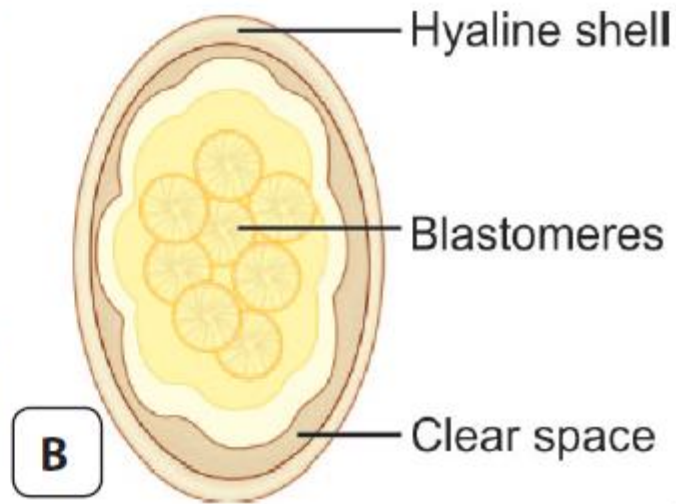
Differences between filariform larvae of *Ancylostoma* *dudenale* and *Strongyloides stercoralis*



Necator size range: 60-75  $\mu\text{m}$  by 35-40  $\mu\text{m}$   
 Ancylostoma size range: 55-60  $\mu\text{m}$  by 35-40  $\mu\text{m}$



## HOOKWORM EGG



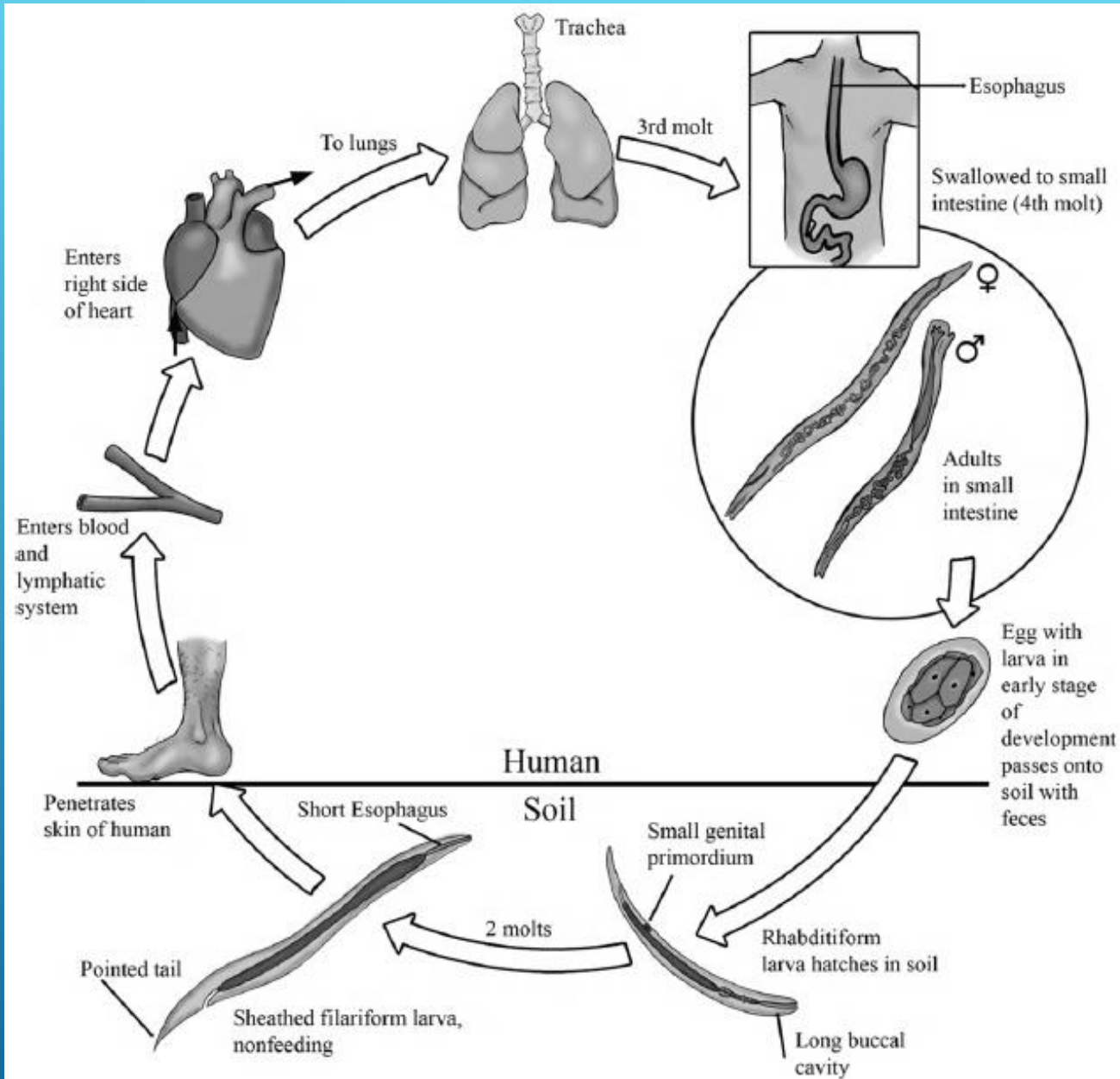
Egg of *Ancylostoma duodenale*. **A.** As seen under microscope;  
**B.** Schematic diagram



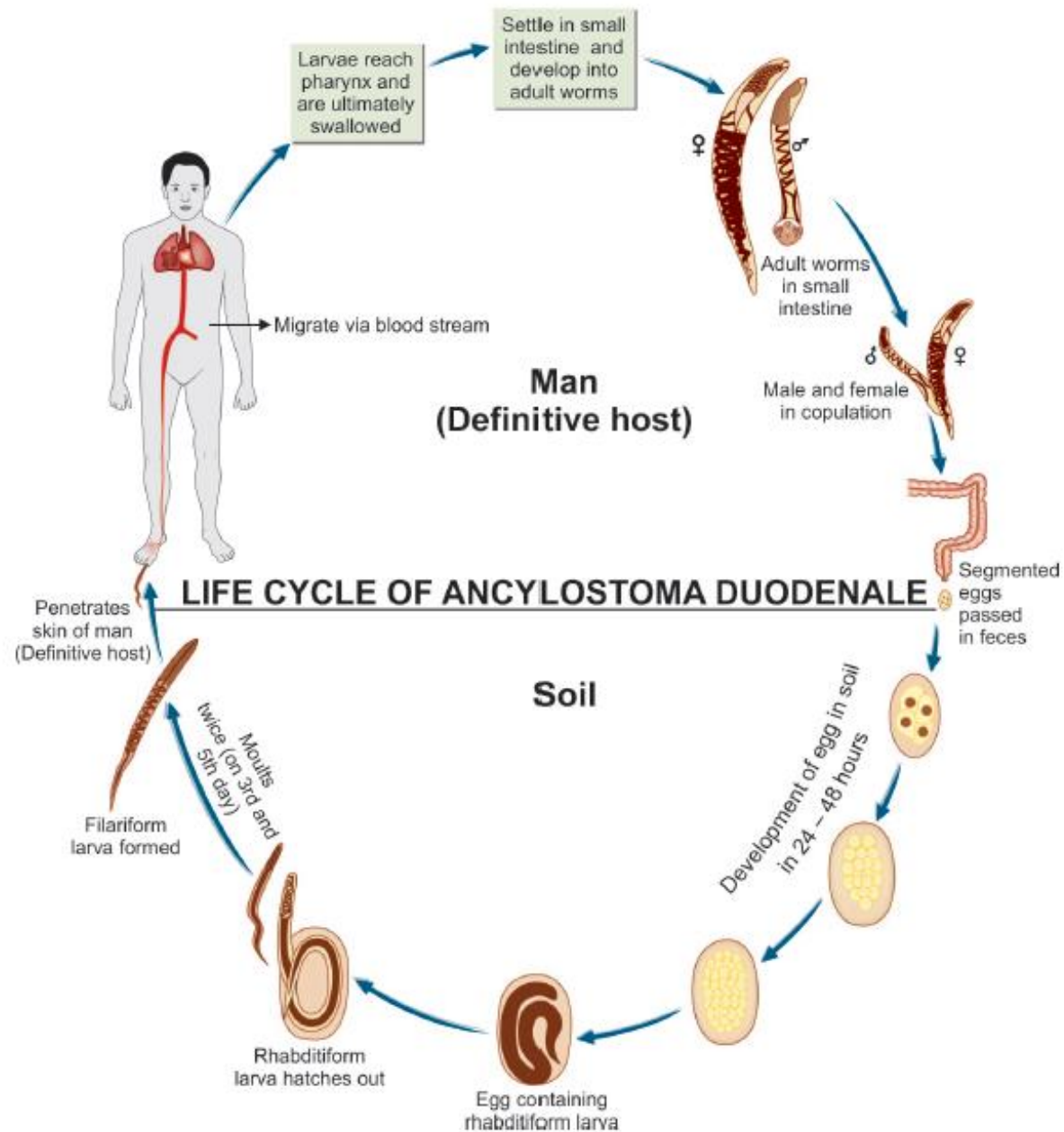


**CUTANEOUS LARVAL MIGRANS**





## LIFE CYCLE OF HOOKWORMS



**LIFE CYCLE OF ANCYLOSTOMA DUODENALE**

DON'T GIVE  
UP

YOU ARE CLOSER THAN YOU THINK

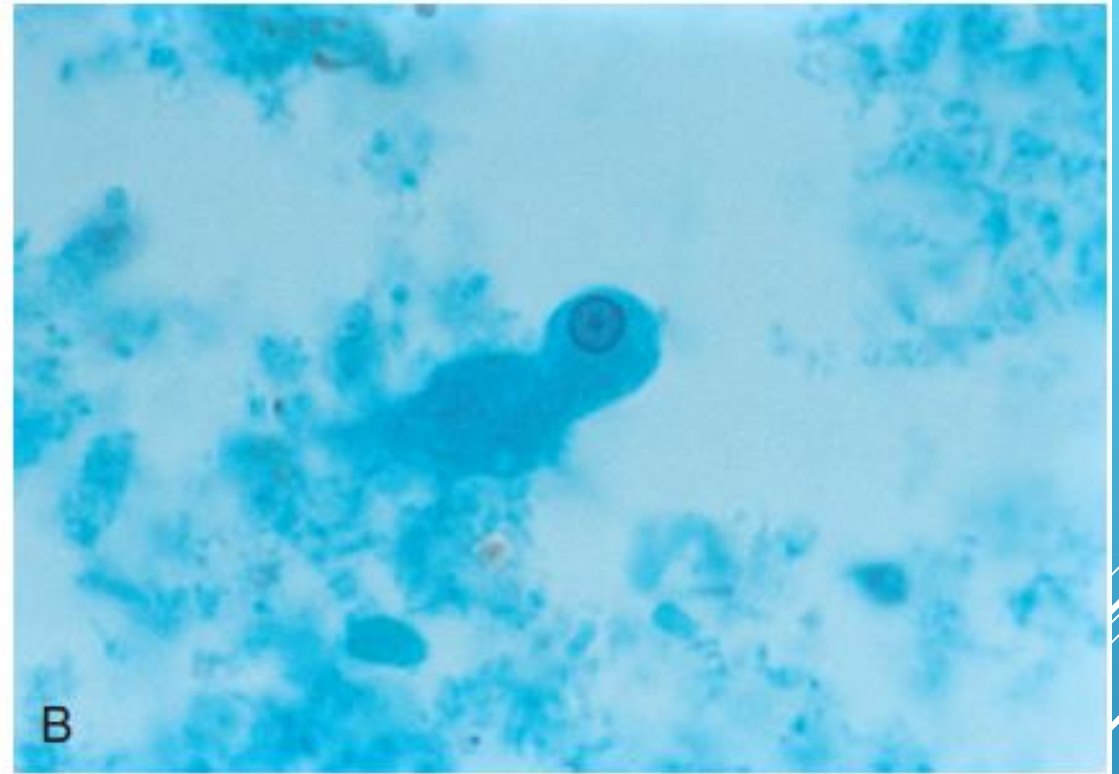
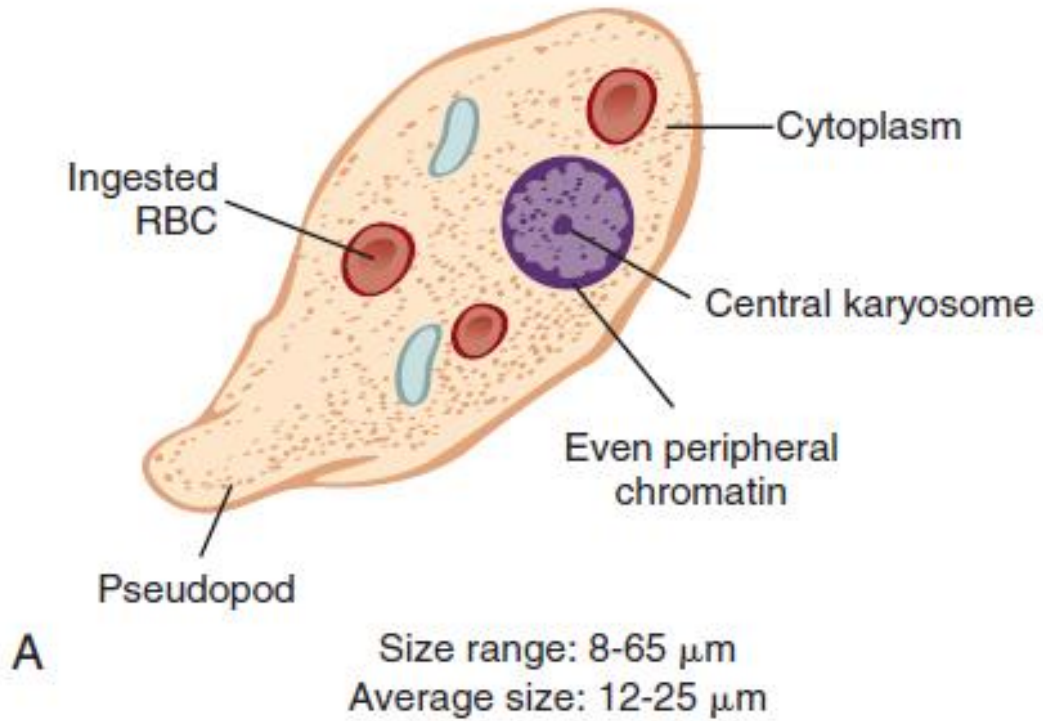
#FUCOS\_ON\_YOUR\_FUTURE ☺

PROTOZOA

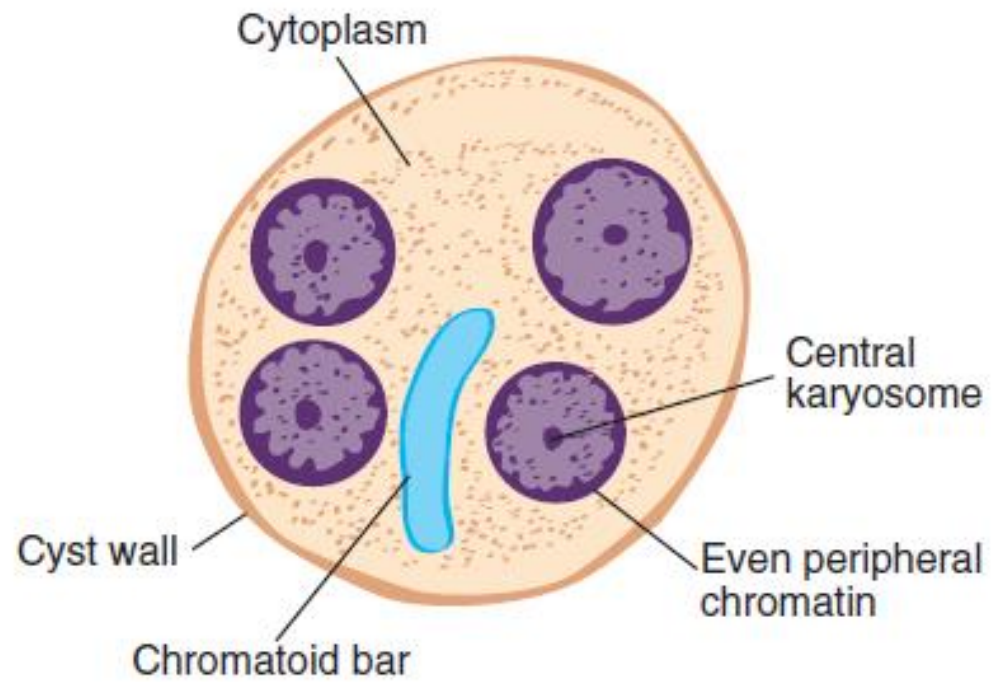
Several thin, white, parallel lines of varying lengths and angles are positioned in the bottom right corner of the image, creating a modern, geometric design element.



# ENTAMOEB A HISTOLYTICA

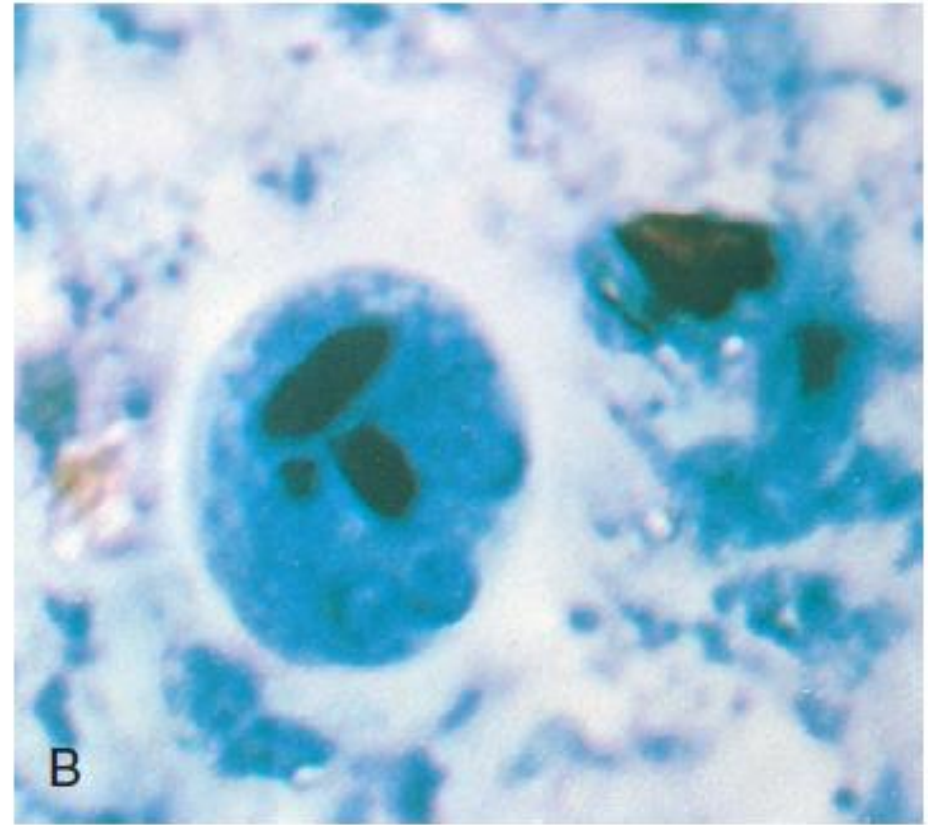


## ENTAMOEBÆ HISTOLYTICÆ TROPHOZOITE



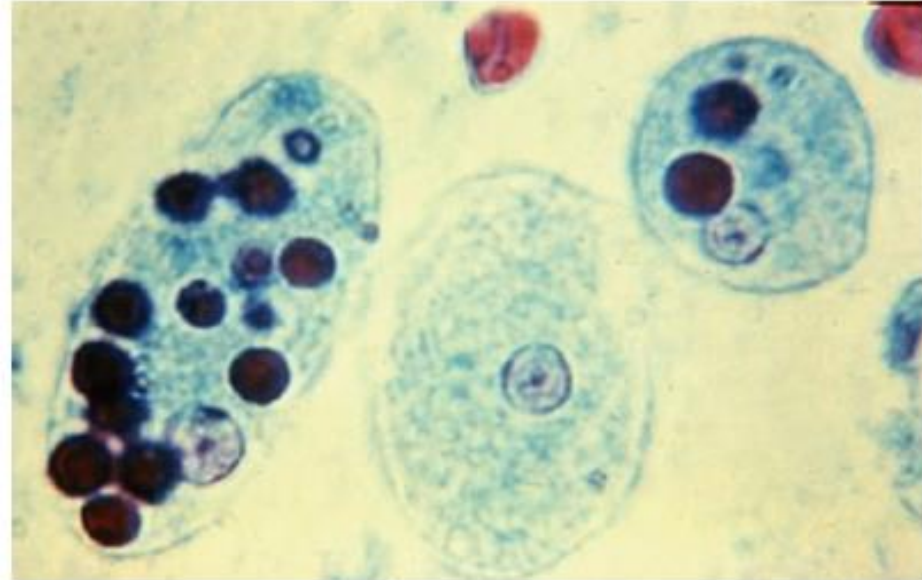
A

Size range: 8-22  $\mu\text{m}$   
Average size: 12-18  $\mu\text{m}$



## ENTAMOEBA HISTOLYTICA CYST





Trophozoite

ingested RBC

cytoplasm

karyosome

nucleus

10 to 20  $\mu\text{m}$

**ENTAMOEBA HISTOLYTICA  
TROPHOZOITE**

**TABLE 3-1**

***Entamoeba histolytica*  
Trophozoite: Typical  
Characteristics at a Glance**

**Parameters**

**Description**

Size range

8-65  $\mu\text{m}$

Motility

Progressive, finger-like  
pseudopodia

Number of nuclei

One

Karyosome

Small and central

Peripheral chromatin

Fine and evenly distributed

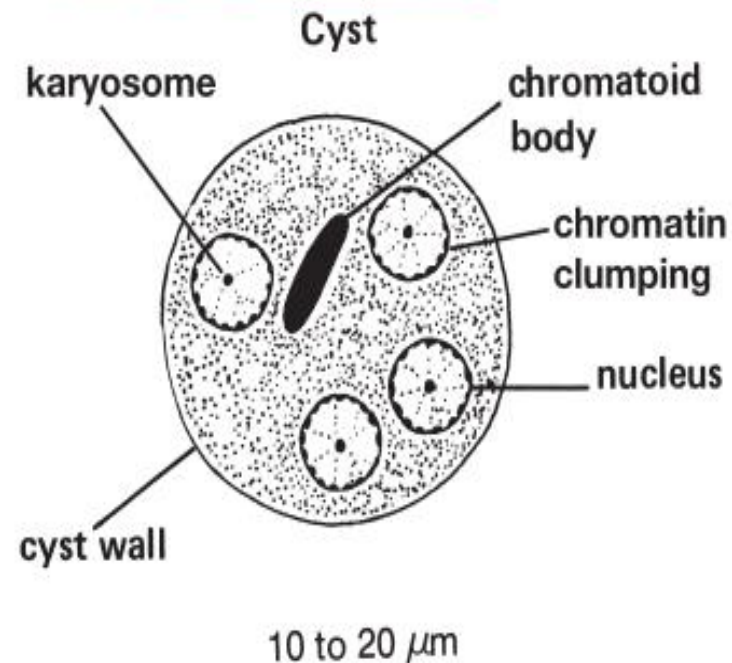
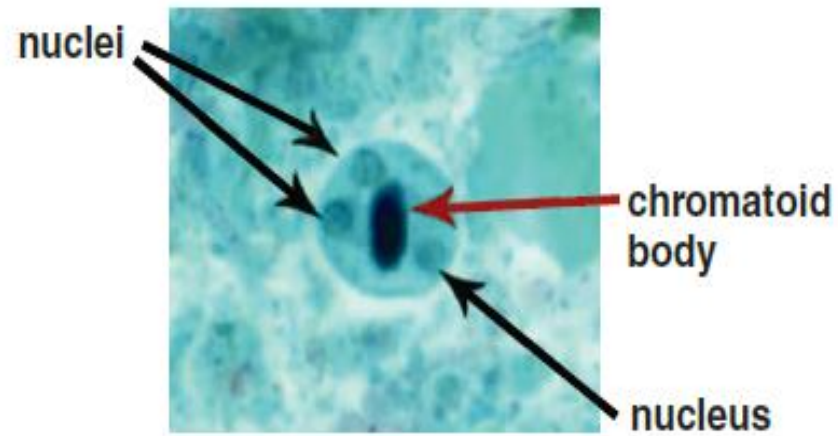
Cytoplasm

Finely granular

Cytoplasmic inclusions

Ingested red blood cells

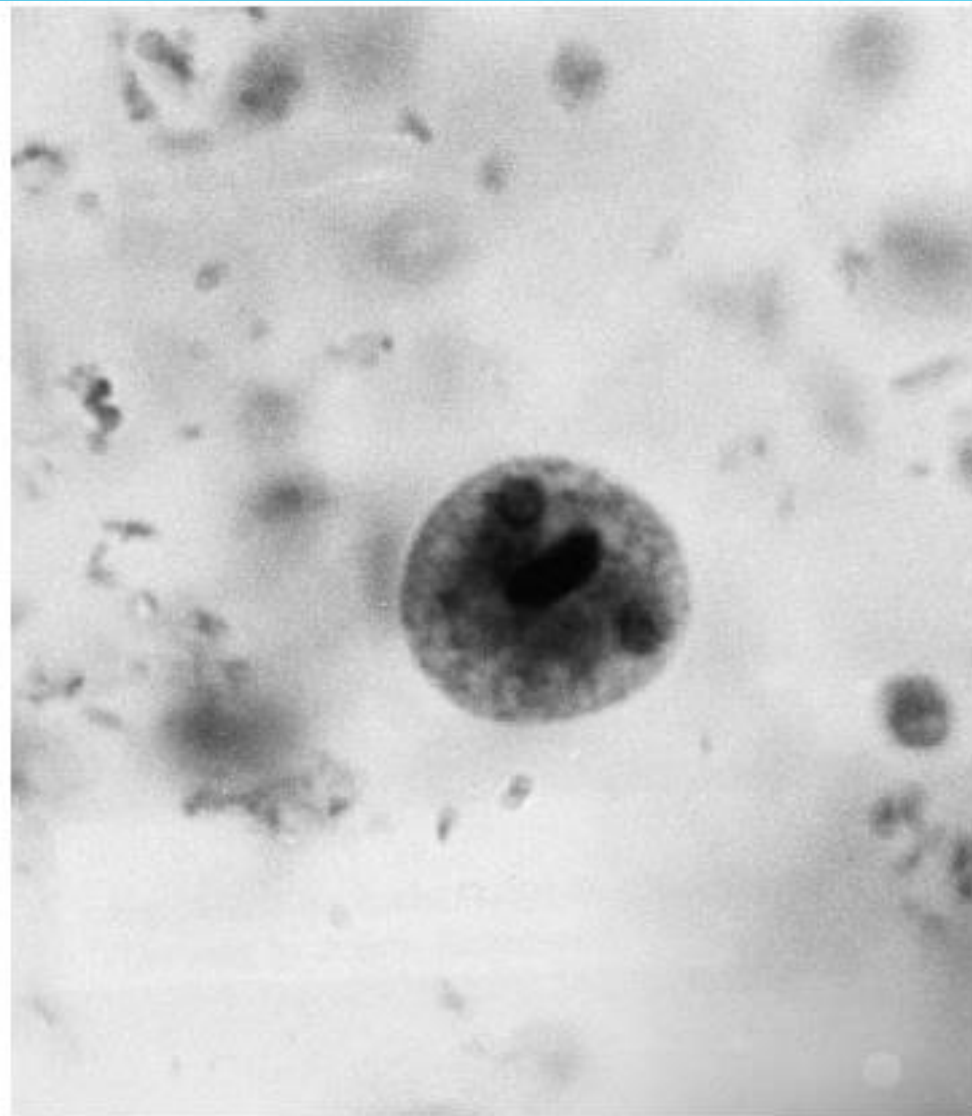




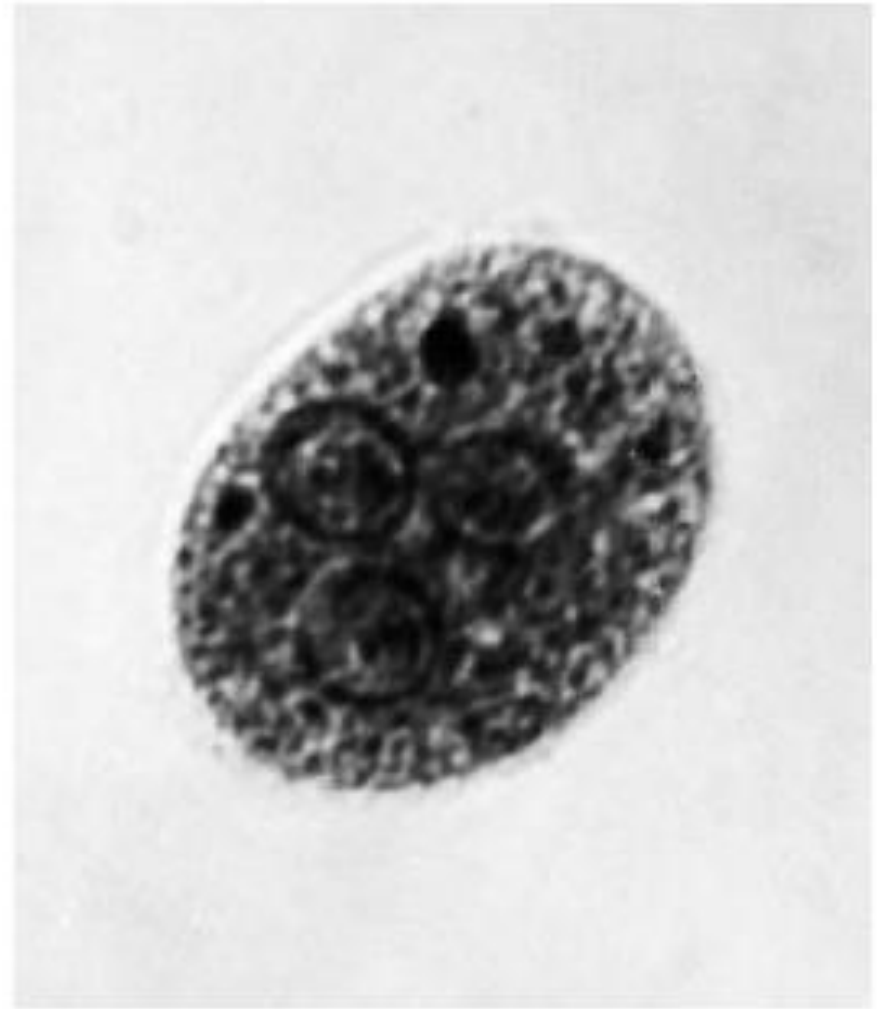
**ENTAMOEBÆ HISTOLYTICÆ  
CYST**

**TABLE 3-2** *Entamoeba histolytica* Cyst:  
Typical Characteristics at  
a Glance

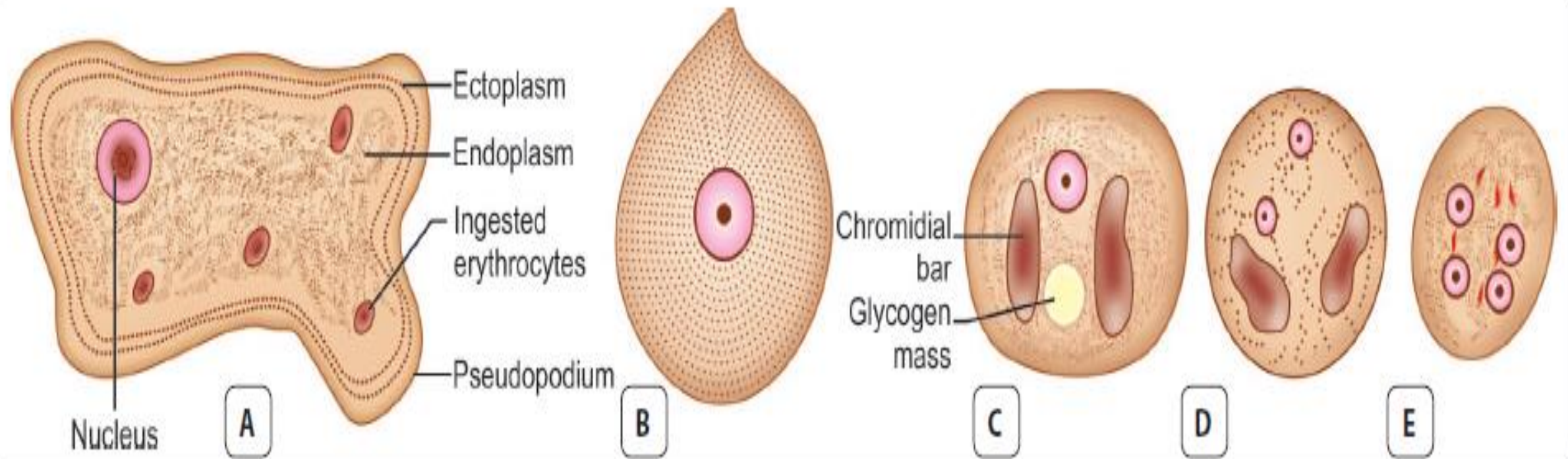
Parameter	Description
Size range	8-22 μm
Shape	Spherical to round
Number of nuclei	One to four
Karyosome	Small and central
Peripheral chromatin	Fine and evenly distributed
Cytoplasm	Finely granular
Cytoplasmic inclusions	Chromatoid bars, rounded ends in young cysts Diffuse glycogen mass in young cysts



**Figure 7.2** Young cyst of *Entamoeba histolytica* containing two nuclei and a prominent chromatoidal bar. Usually, such a cyst is 10  $\mu\text{m}$  to 20  $\mu\text{m}$  wide.

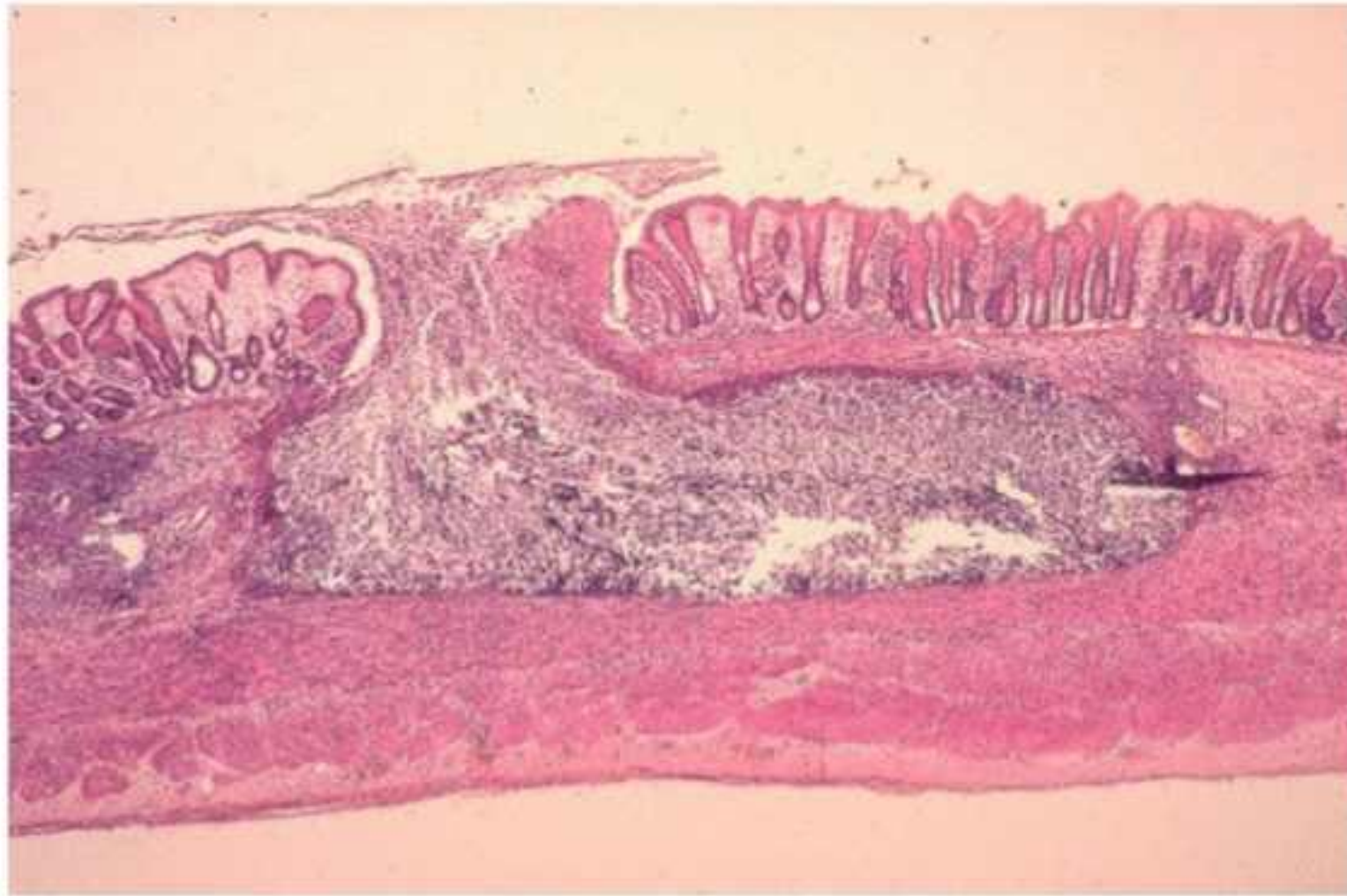


**Figure 7.4** Metacyst of *Entamoeba histolytica*. Three of the four nuclei are in focus, and two small chromatoid bodies can be seen.



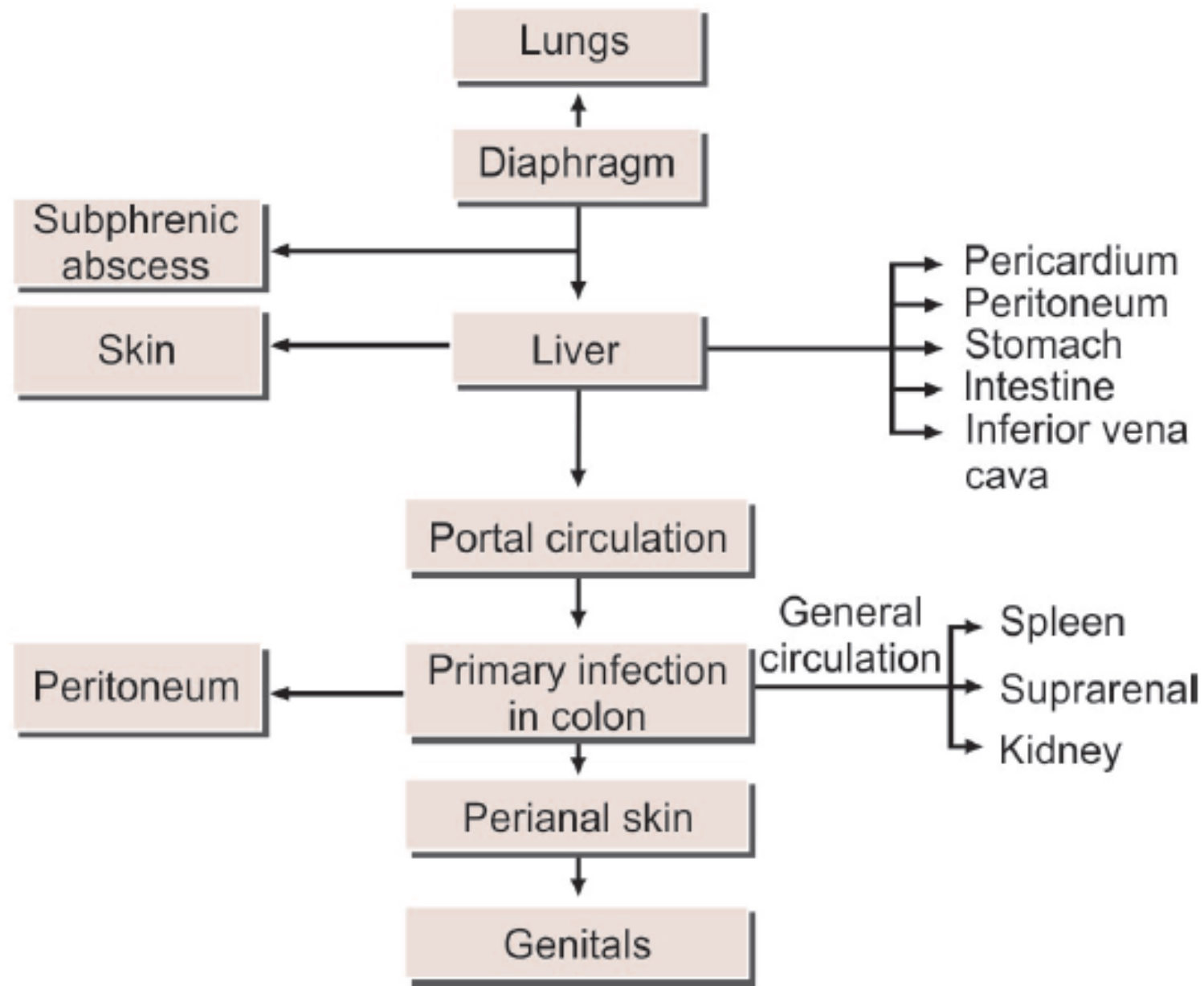
**Fig. 3.1:** *Entamoeba histolytica*. **A.** Trophozoite; **B.** Precystic stage; **C.** Uninucleate cyst; **D.** Binucleate cyst; **E.** Mature quadrinucleate cyst





**Flask shaped ulcers -Base in submucosa and small opening on the mucosal surface**





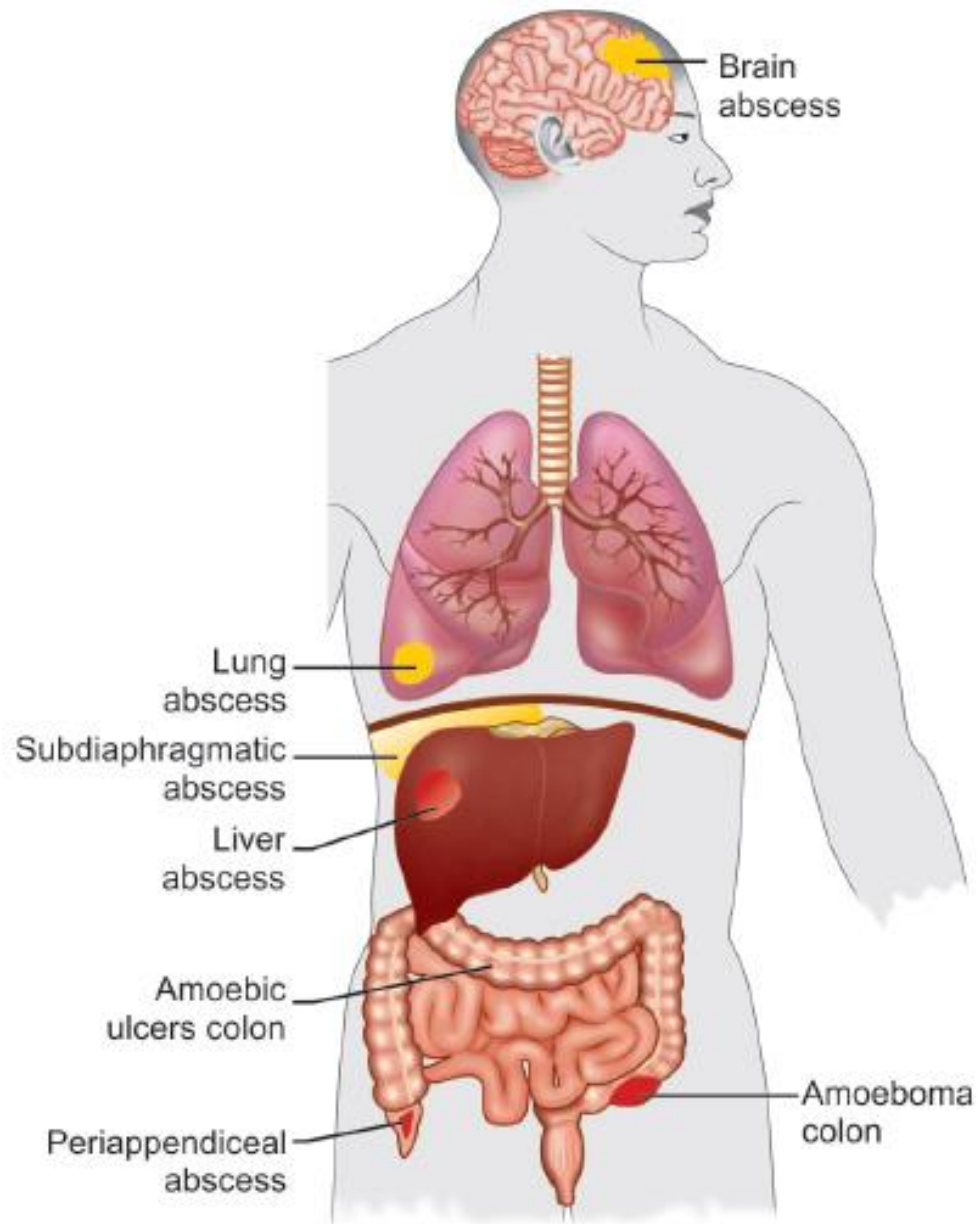
**Flowchart 3.2:** Sites affected in amoebiasis



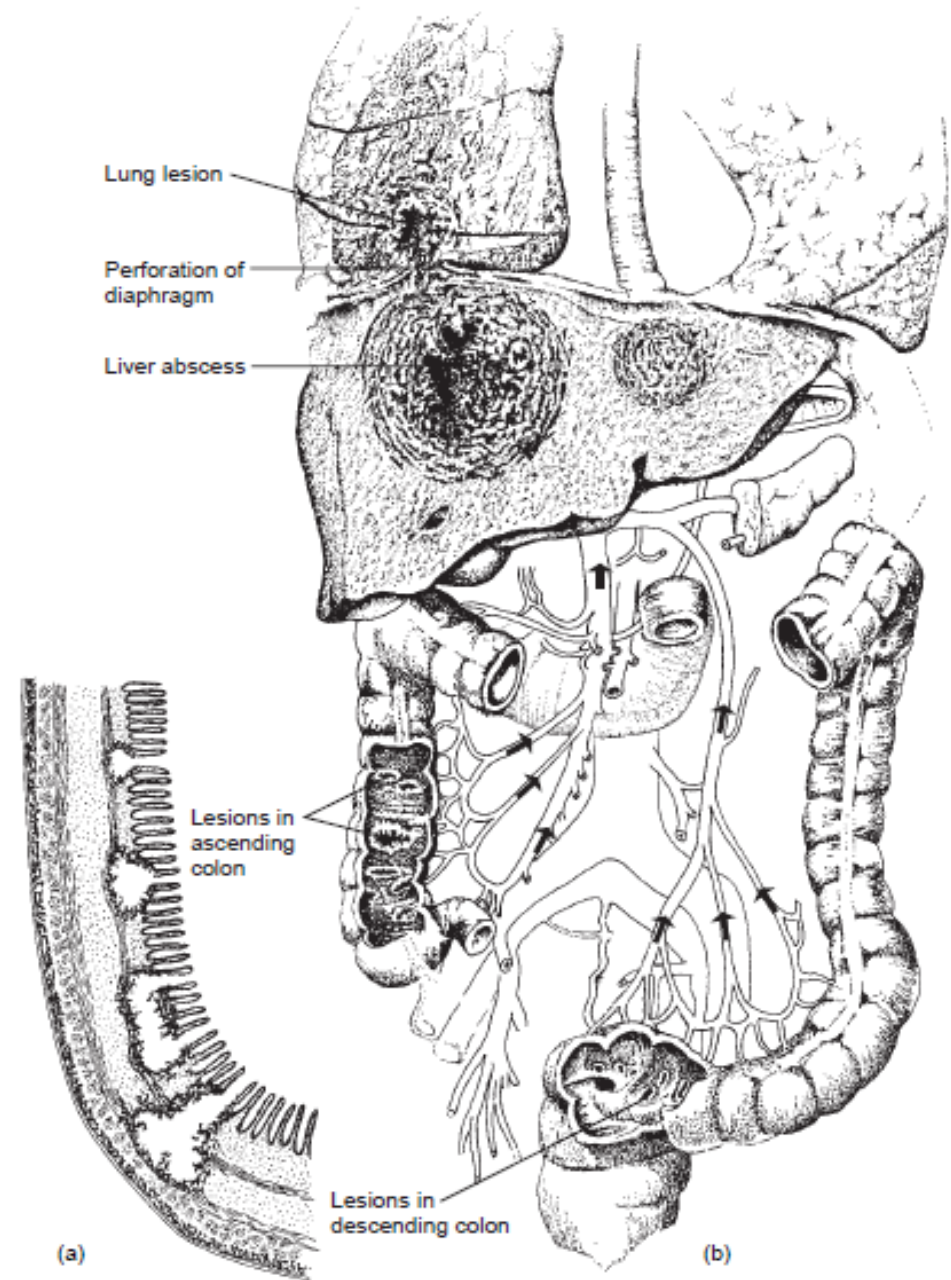
**Fig. 3.3:** Intestinal amoebiasis: Specimen showing amoebic ulcer in colon



**Fig. 3.4:** Specimen showing amoebic liver abscess



**Fig. 3.5: Lesions of Amoebiasis**



**Major pathology of amoebiasis.**



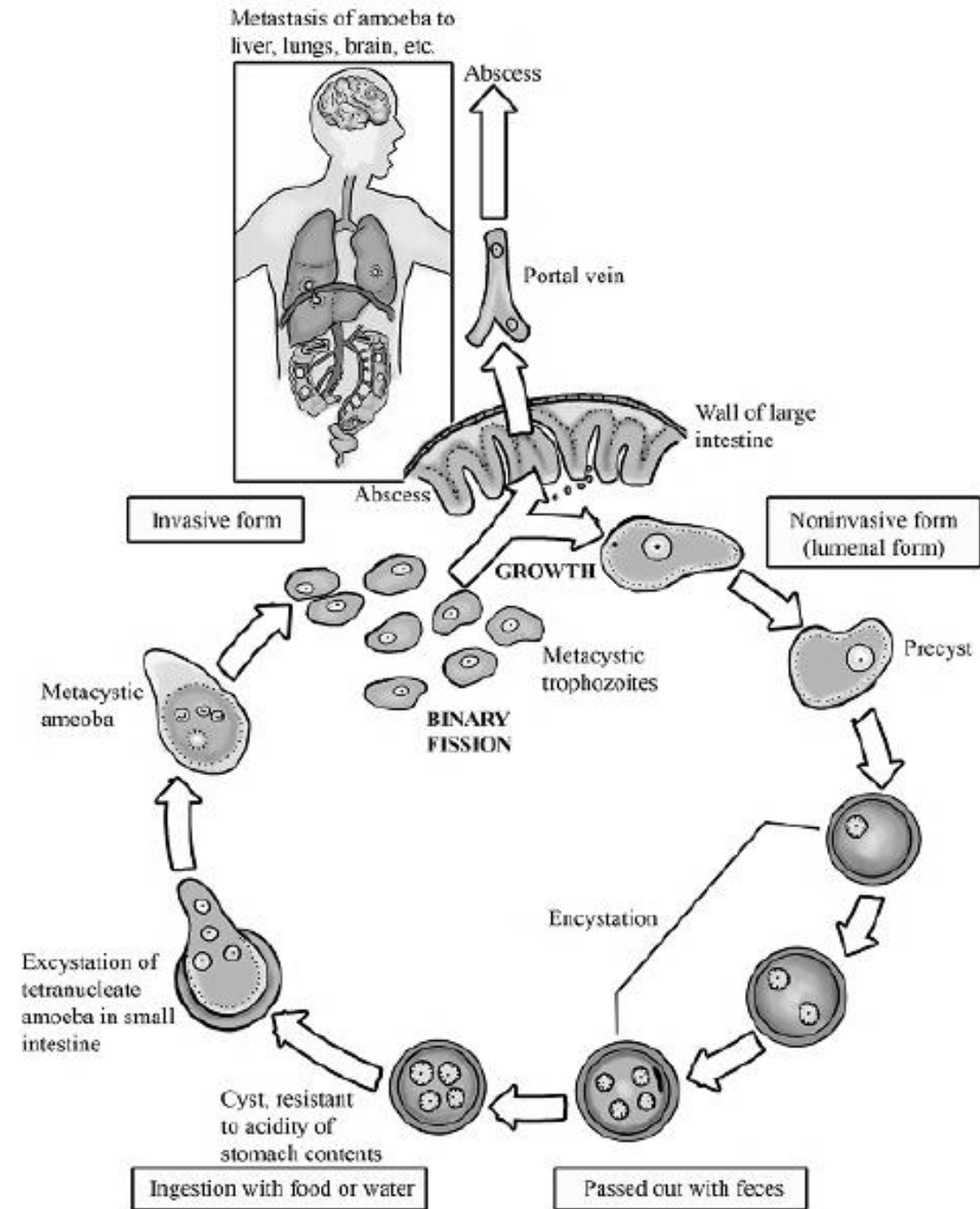
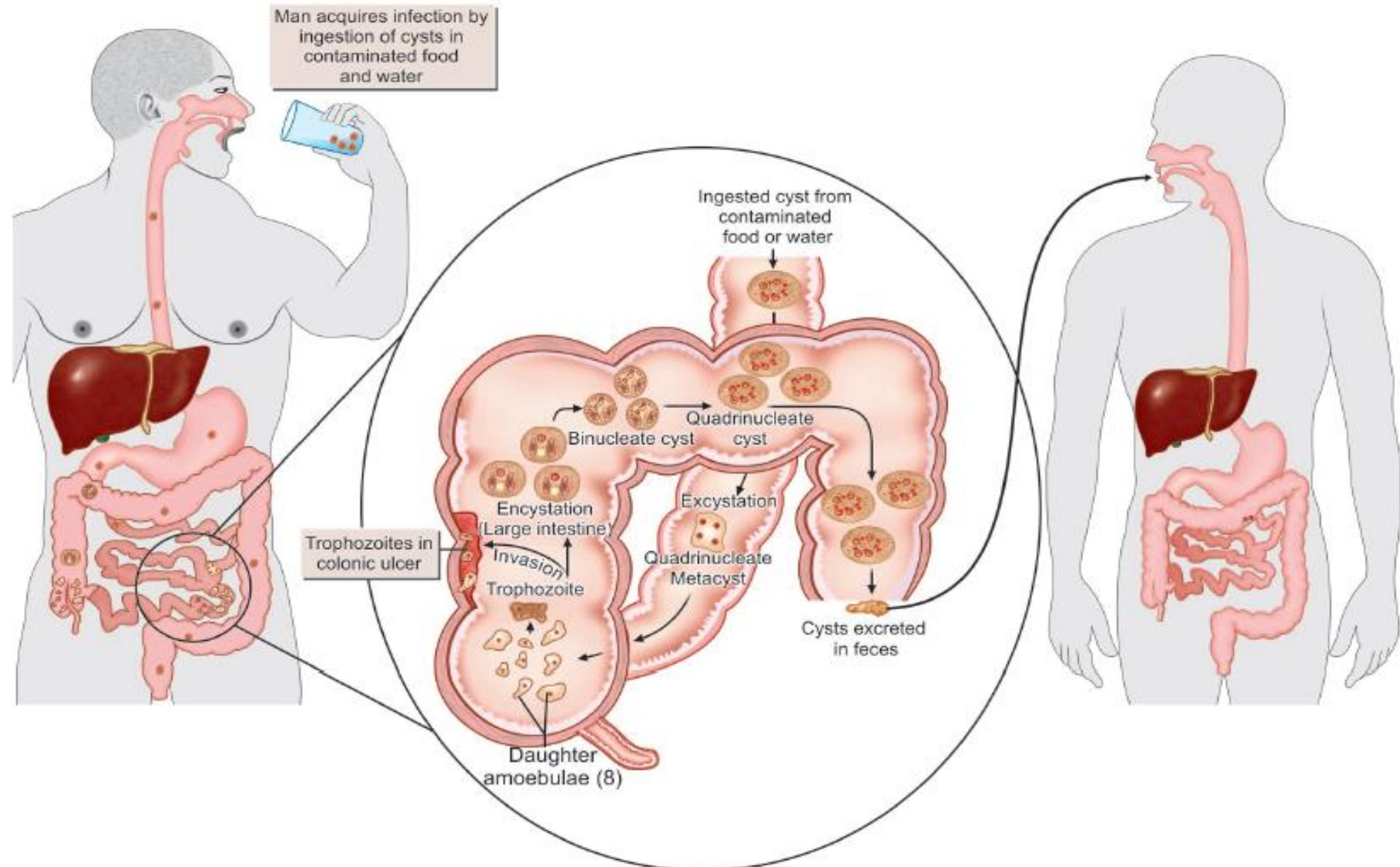


FIGURE 4-2 Life cycle of *E. histolytica*. Credit: Image courtesy of Gino Barzizza.

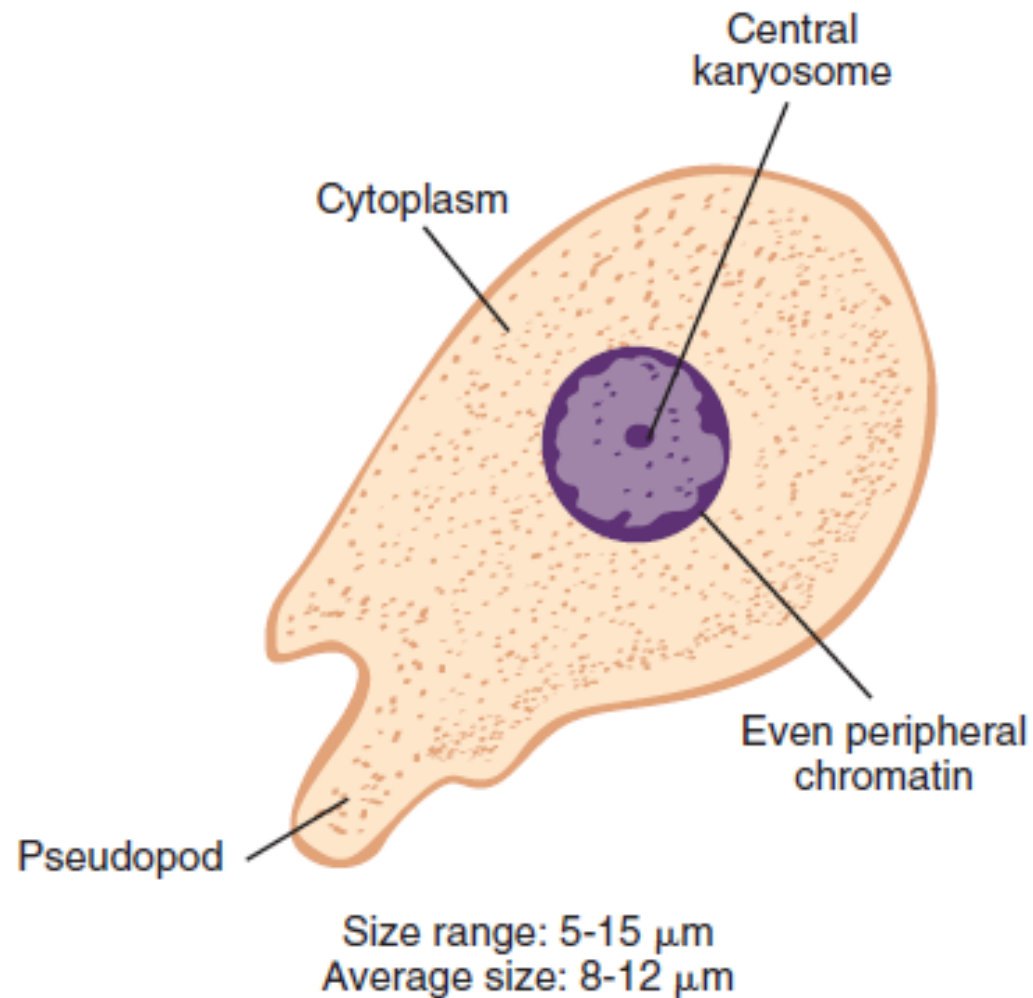




**LIFE CYCLE OF ENTAMOEBA HISTOLYTICA**

COMMENSAL

AMOEBAE

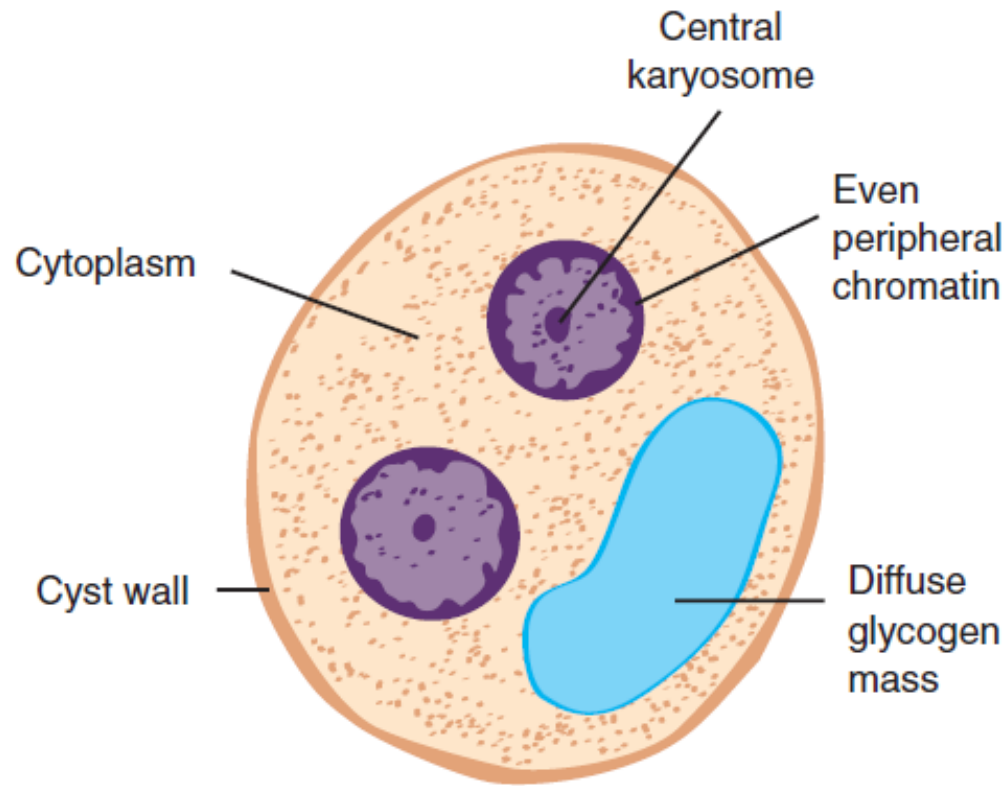


**ENTAMOEBA HARTMANNI TROPHOZOITE**

**TABLE 3-3**

***Entamoeba hartmanni*  
Trophozoite: Typical  
Characteristics at a Glance**

Parameter	Description
Size range	5-15 $\mu\text{m}$
Motility	Nonprogressive, finger-like pseudopods
Number of nuclei	One
Karyosome	Small and central
Peripheral chromatin	Fine and evenly distributed
Cytoplasm	Finely granular
Cytoplasmic inclusions	Ingested bacteria may be present



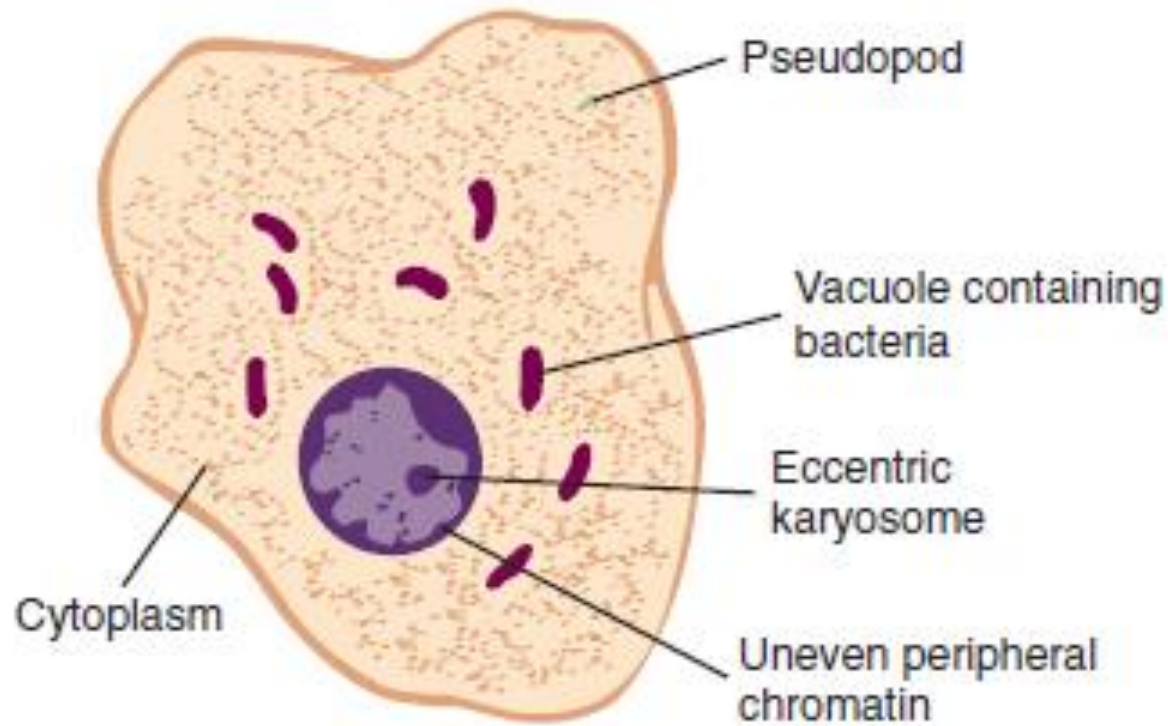
Size range: 5-12  $\mu\text{m}$   
Average size: 7-9  $\mu\text{m}$

## ENTAMOEBA HARTMANNI CYST

**TABLE 3-4** *Entamoeba hartmanni* Cyst:  
Typical Characteristics at  
a Glance

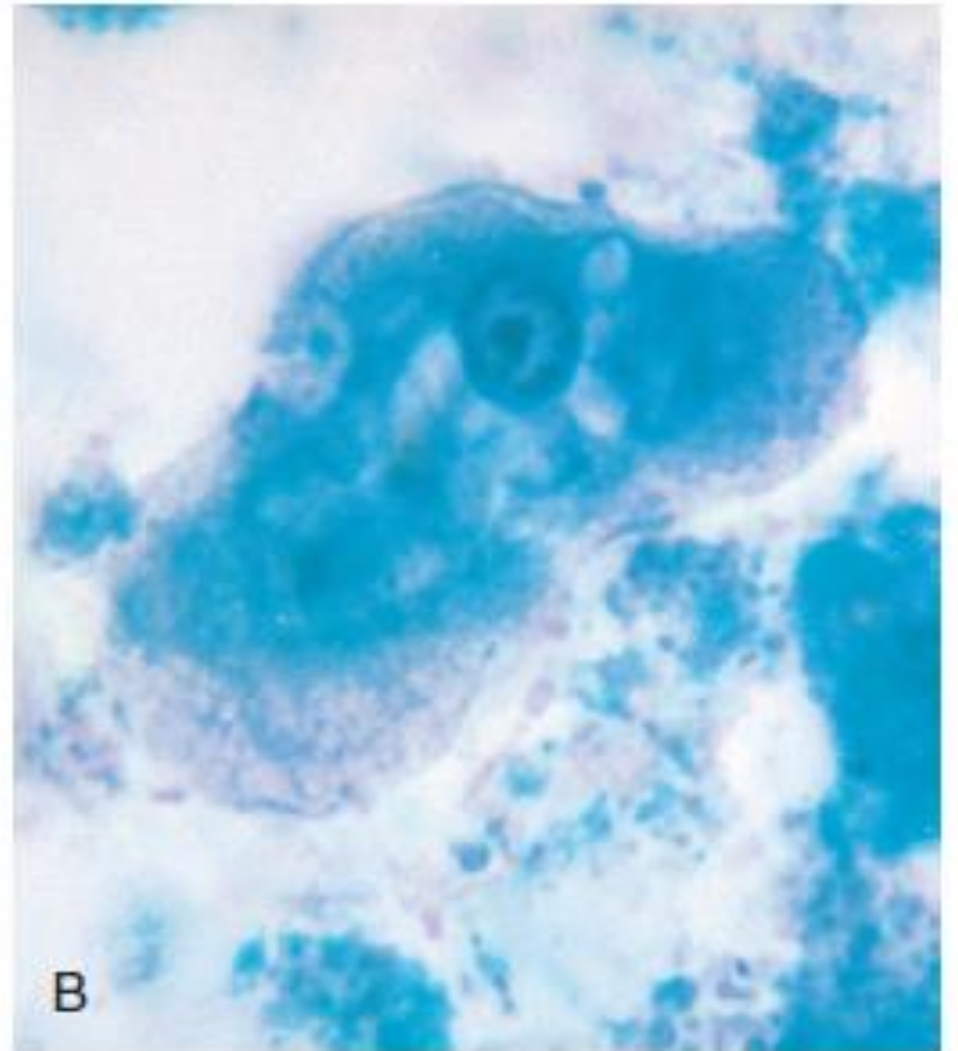
Parameter	Description
Size range	5-12 $\mu\text{m}$
Shape	Spherical
Number of nuclei	One to four
Karyosome	Small and central
Peripheral chromatin	Fine and evenly distributed
Cytoplasm	Finely granular
Cytoplasmic inclusions	Chromatoid bars, rounded ends in young cysts Diffuse glycogen mass in young cysts



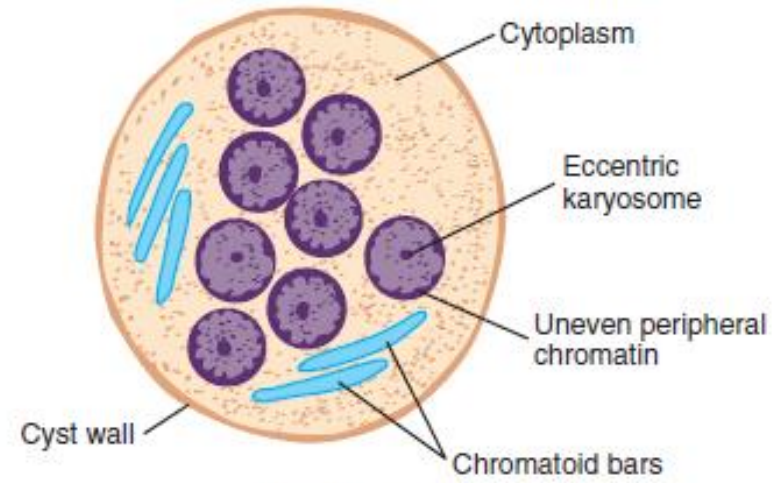


A

Size range: 12-55  $\mu\text{m}$   
Average size: 18-27  $\mu\text{m}$

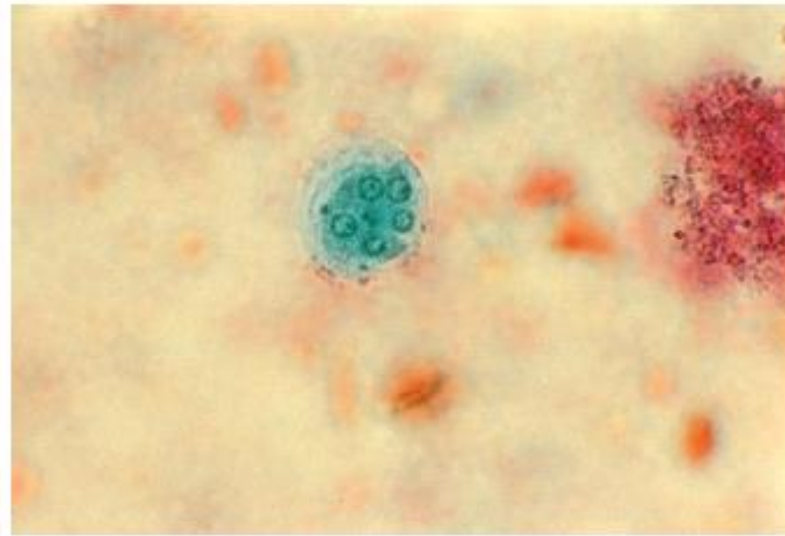
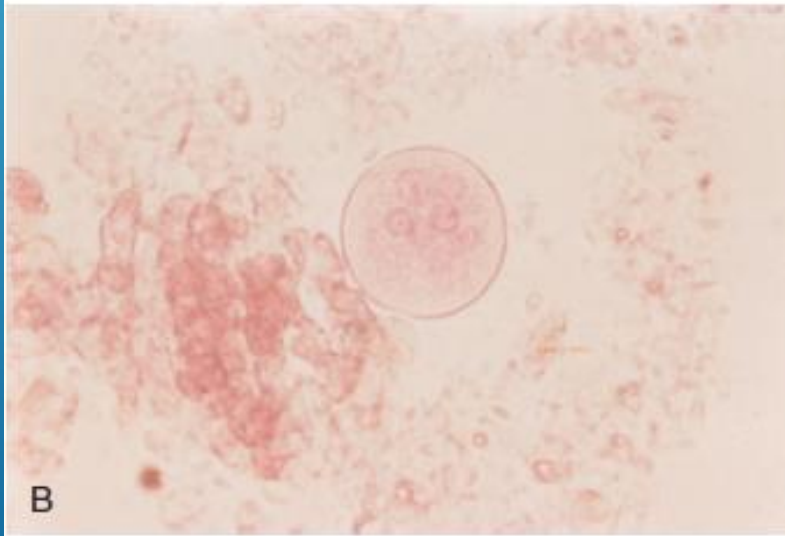


## ENTAMOEBÆ COLI TROPHOZOITE

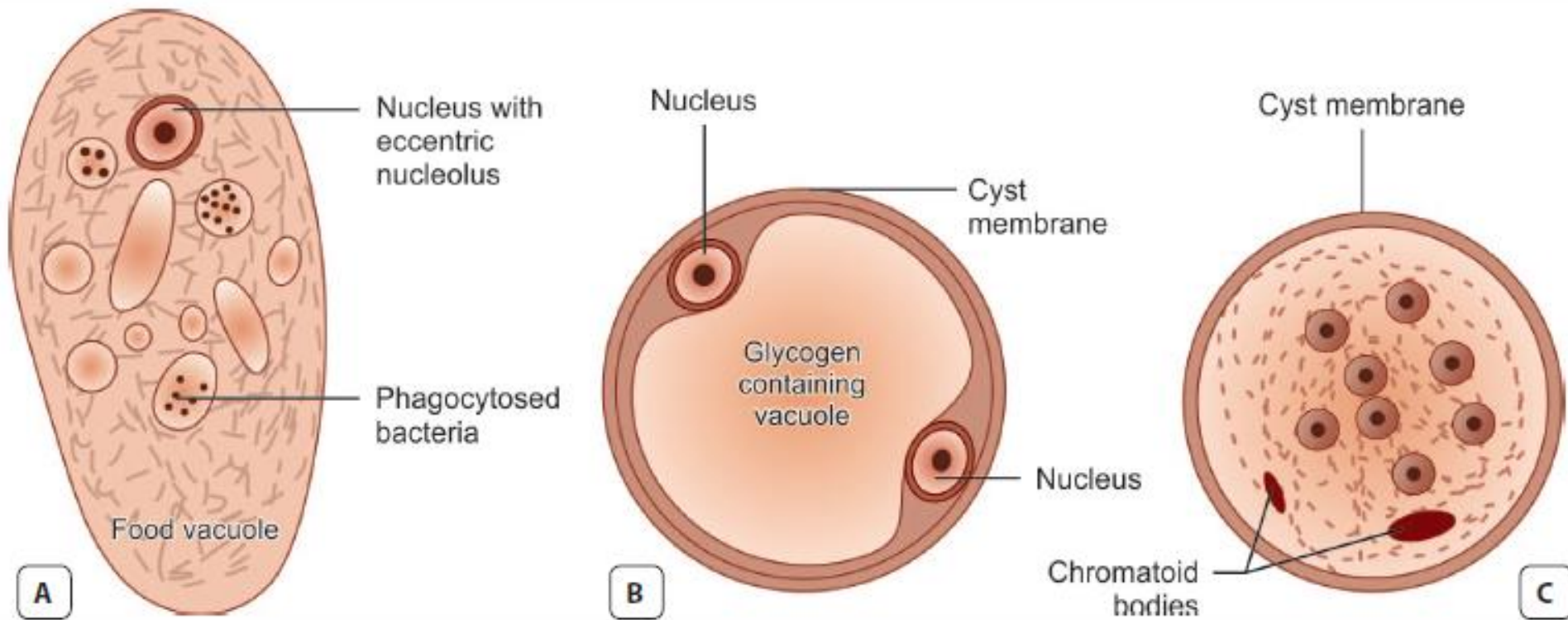


A

Size range: 8-35  $\mu\text{m}$   
Average size: 12-25  $\mu\text{m}$



**ENTAMOEBÆ COLI CYST**



**Fig. 3.7:** Schematic diagram of the morphological forms of *Entamoeba coli* (Heidenhain's hematoxylin Magn. X 2000). **A.** Vegetative form; **B.** Binucleate cyst; **C.** Eight-nucleate cyst

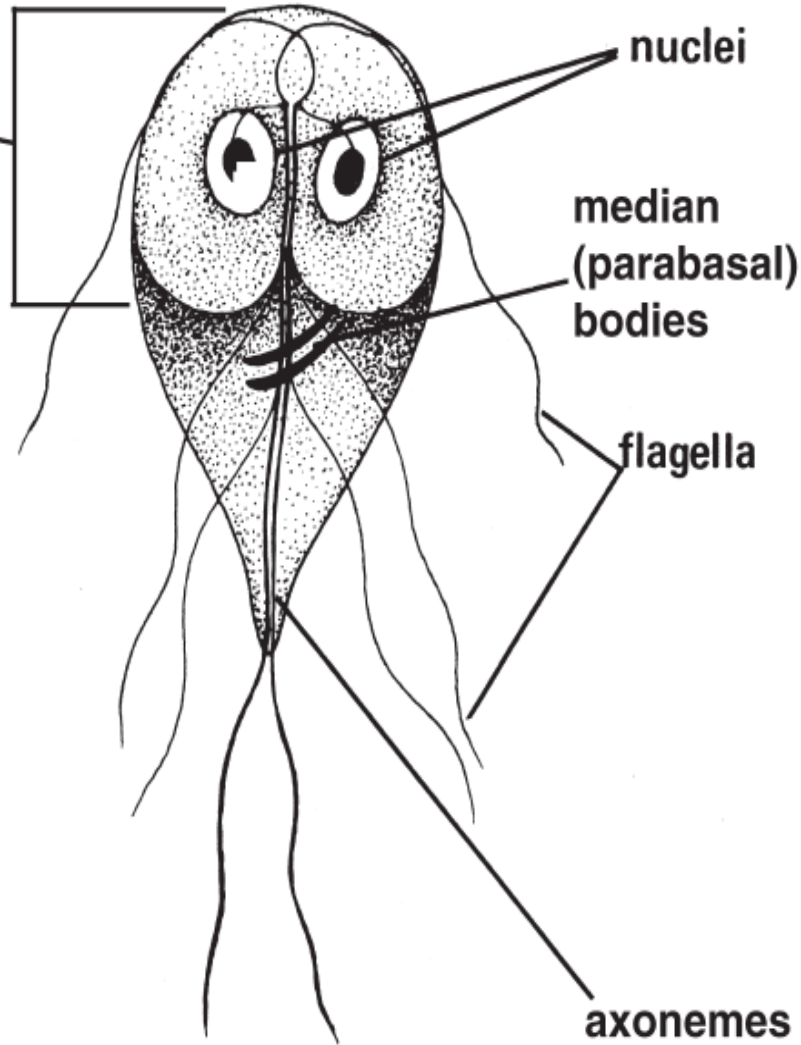


GIARDIA

LAMBLLIA

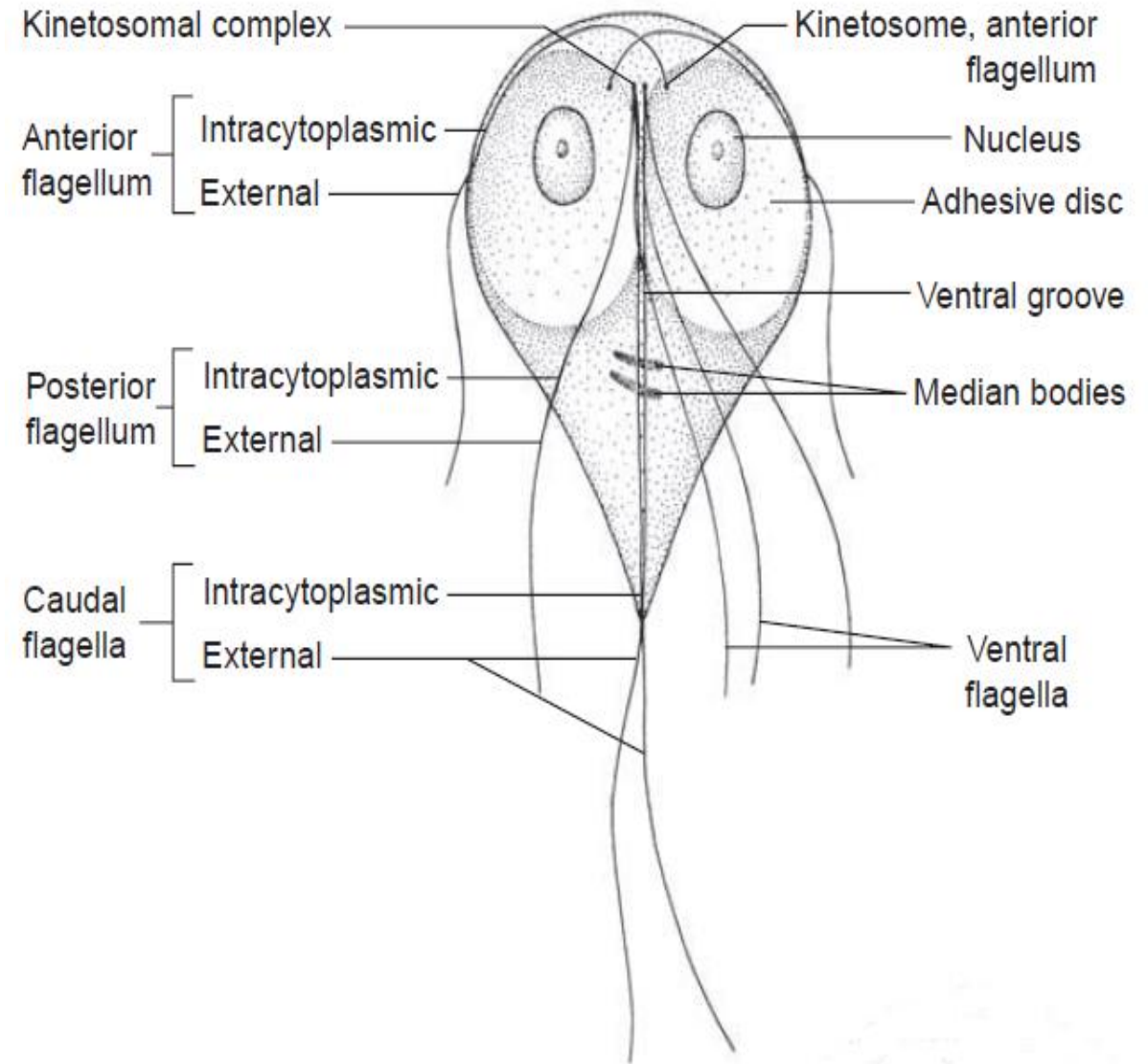


sucking disk  
on ventral surface

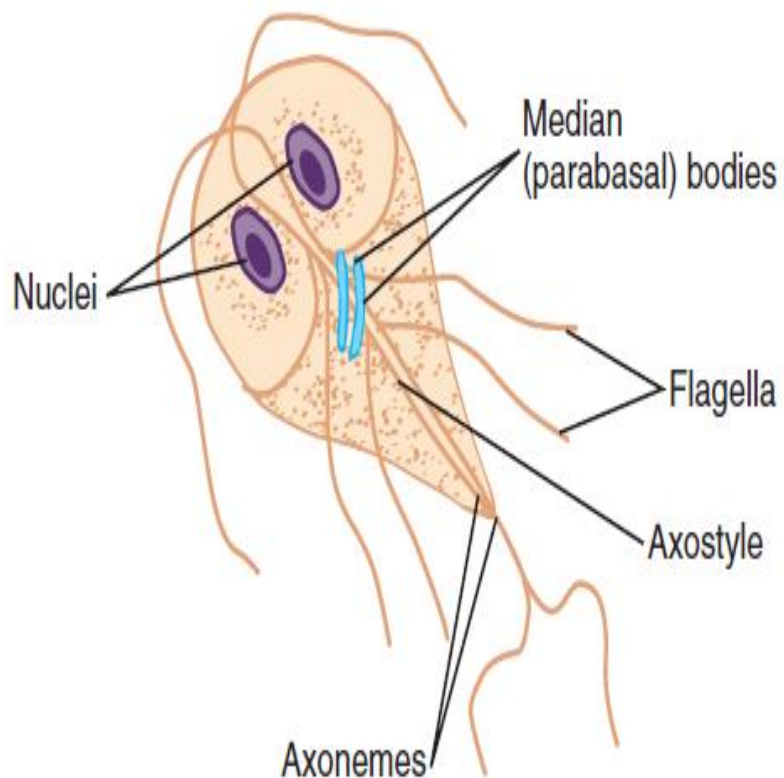


12 to 15  $\mu\text{m}$

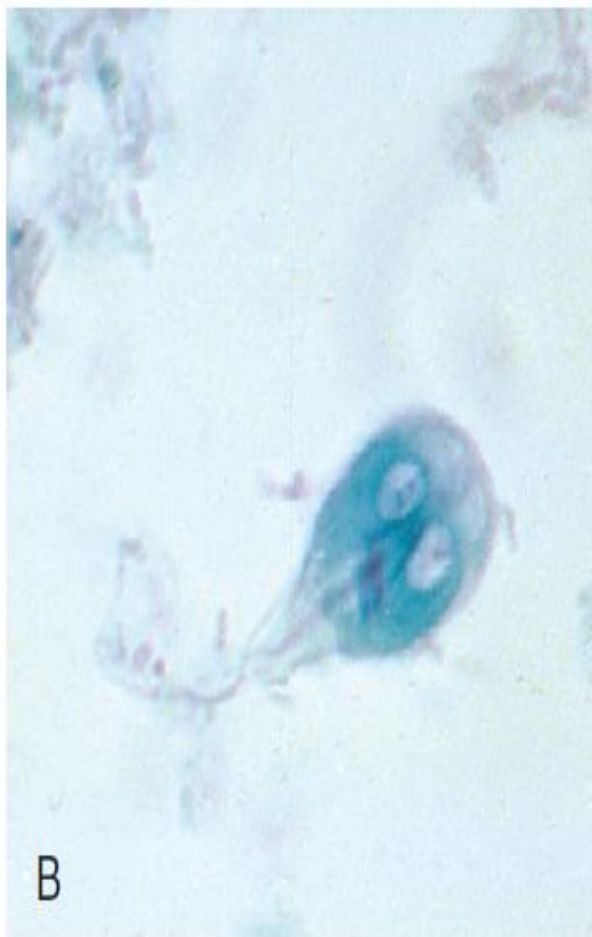
**GIARDIA LAMBLIA TROPHOZOITE**



**GIARDIA LAMBLIA TROPHOZOITE**



Size range: 8-20  $\mu\text{m}$  by 5-16  $\mu\text{m}$   
Average length: 10-15  $\mu\text{m}$

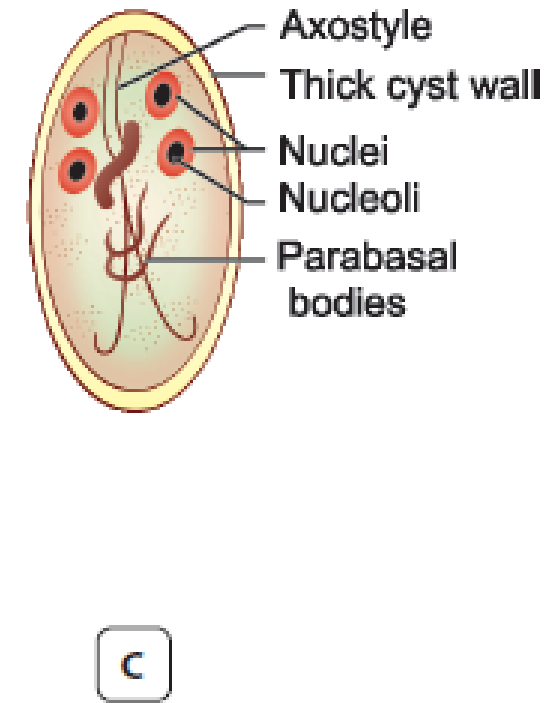
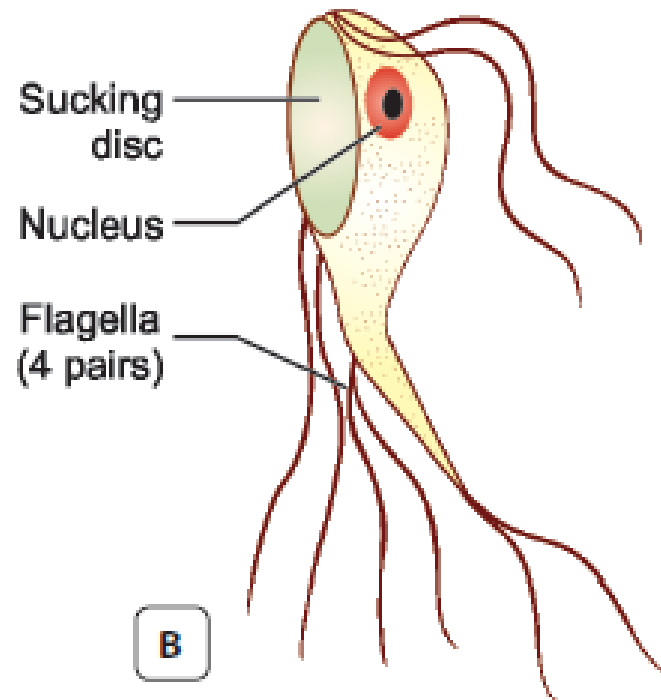
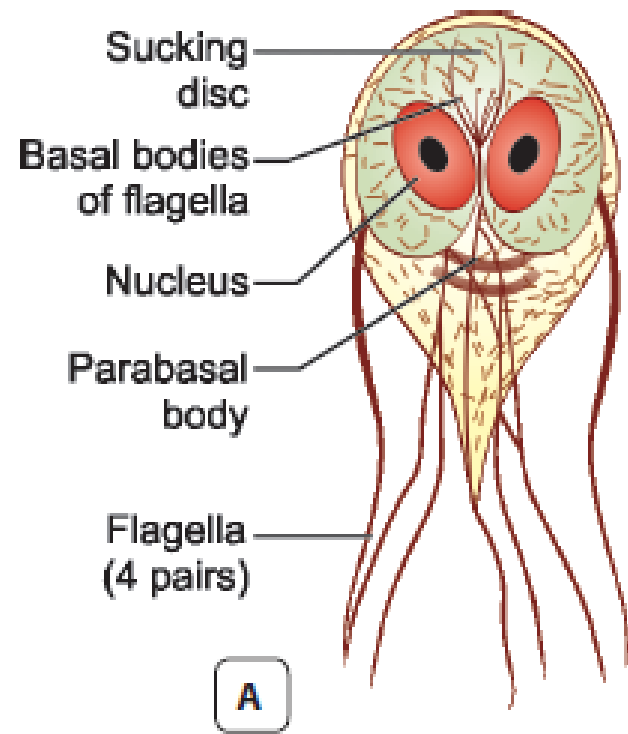


## GIARDIA LAMBLIA TROPHOZOITE

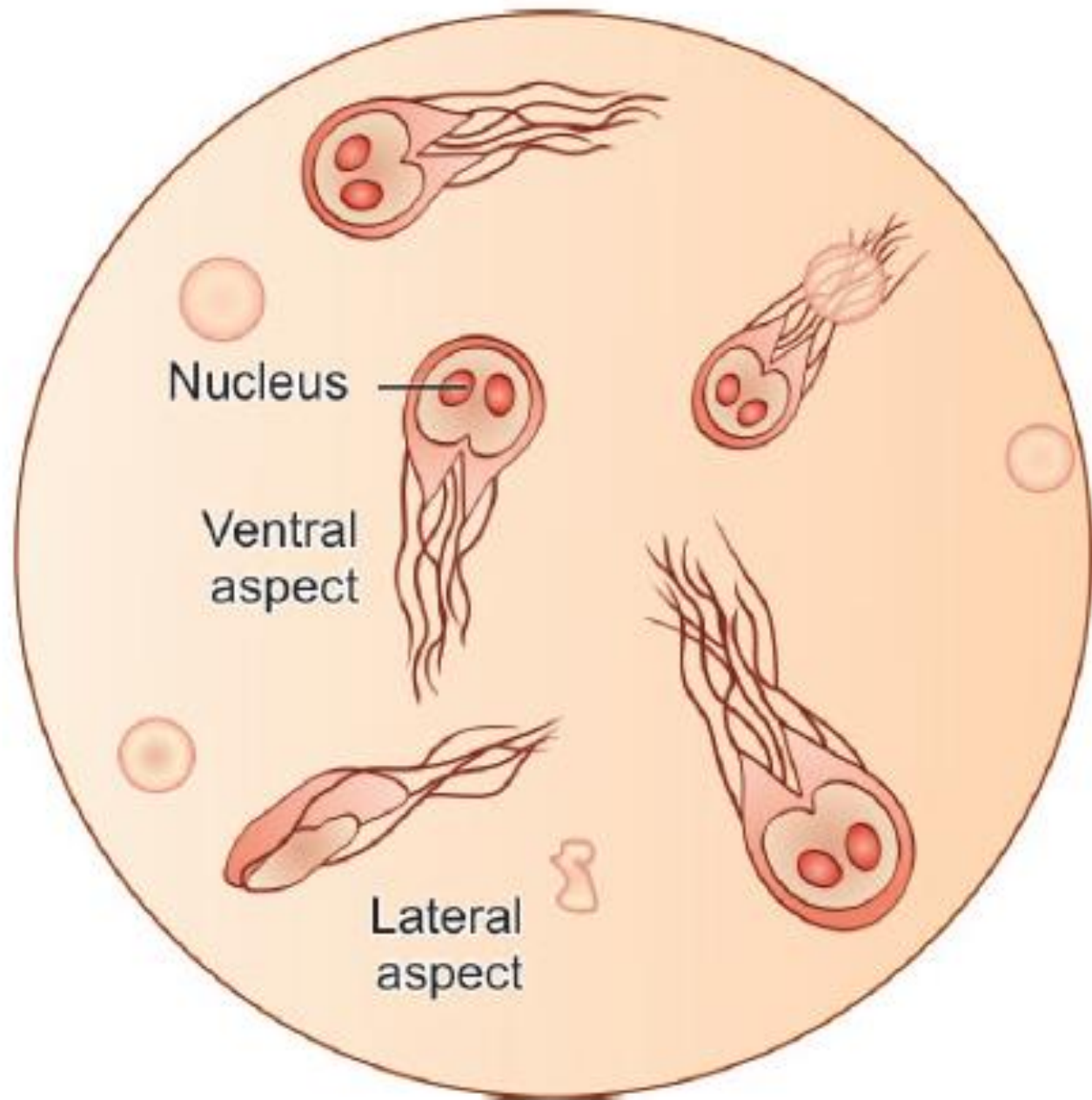
**TABLE 4-1**

### *Giardia intestinalis* Trophozoite: Typical Characteristics at a Glance

Parameter	Description
Size range	8-20 $\mu\text{m}$ long 5-16 $\mu\text{m}$ wide
Shape	Pear-shaped, teardrop
Motility	Falling leaf
Appearance	Bilaterally symmetrical
Nuclei	Two ovoid-shaped, each with a large karyosome No peripheral chromatin
Flagella	Four pairs, origination of each: One pair, anterior end One pair, posterior end Two pair, central, extending laterally
Other structures	Two median bodies Two axonemes Sucking disk

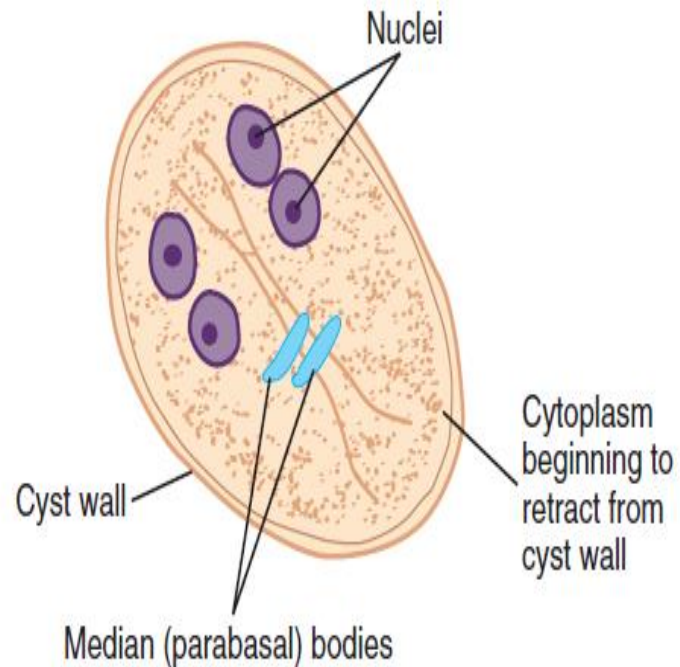


**Fig. 4.2: Trophozoite. A. Ventral view; B. Lateral view; C. Quadrinucleate Cyst**



**Fig. 4.1:** *Giardia lamblia* in duodenal fluid wet preparation.





Size range: 8-17  $\mu\text{m}$  by 6-10  $\mu\text{m}$   
Average length: 10-12  $\mu\text{m}$



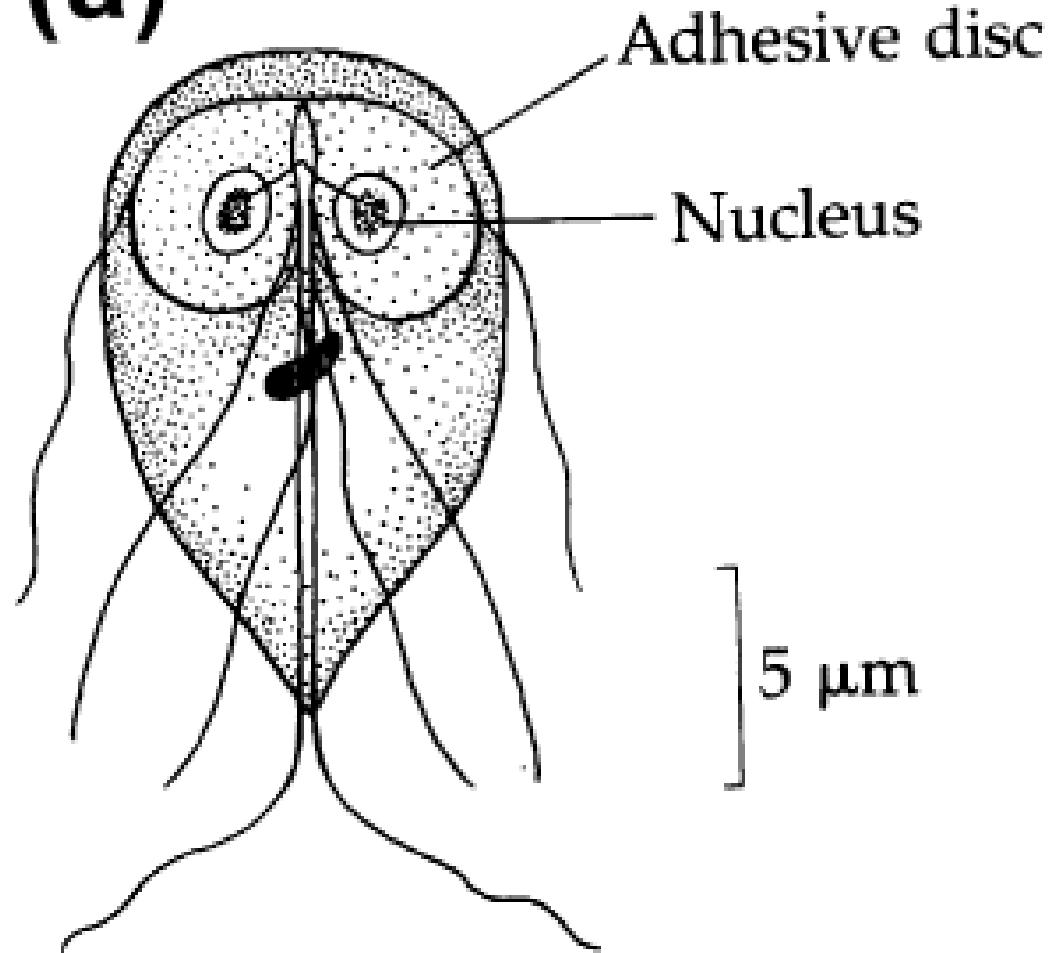
## GIARDIA LAMBLIA CYST

**TABLE 4-2**

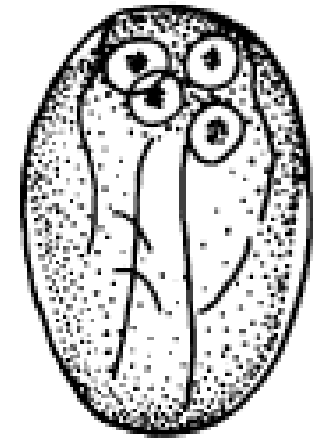
### ***Giardia intestinalis* Cyst: Typical Characteristics at a Glance**

Parameter	Description
Size range	8-17 $\mu\text{m}$ long 6-10 $\mu\text{m}$ wide
Shape	Ovoid
Nuclei	Immature cyst, two Mature cyst, four Central karyosomes No peripheral chromatin
Cytoplasm	Retracted from cell wall
Other structures	Median bodies: two in immature cyst or four in fully mature cyst Interior flagellar structures*

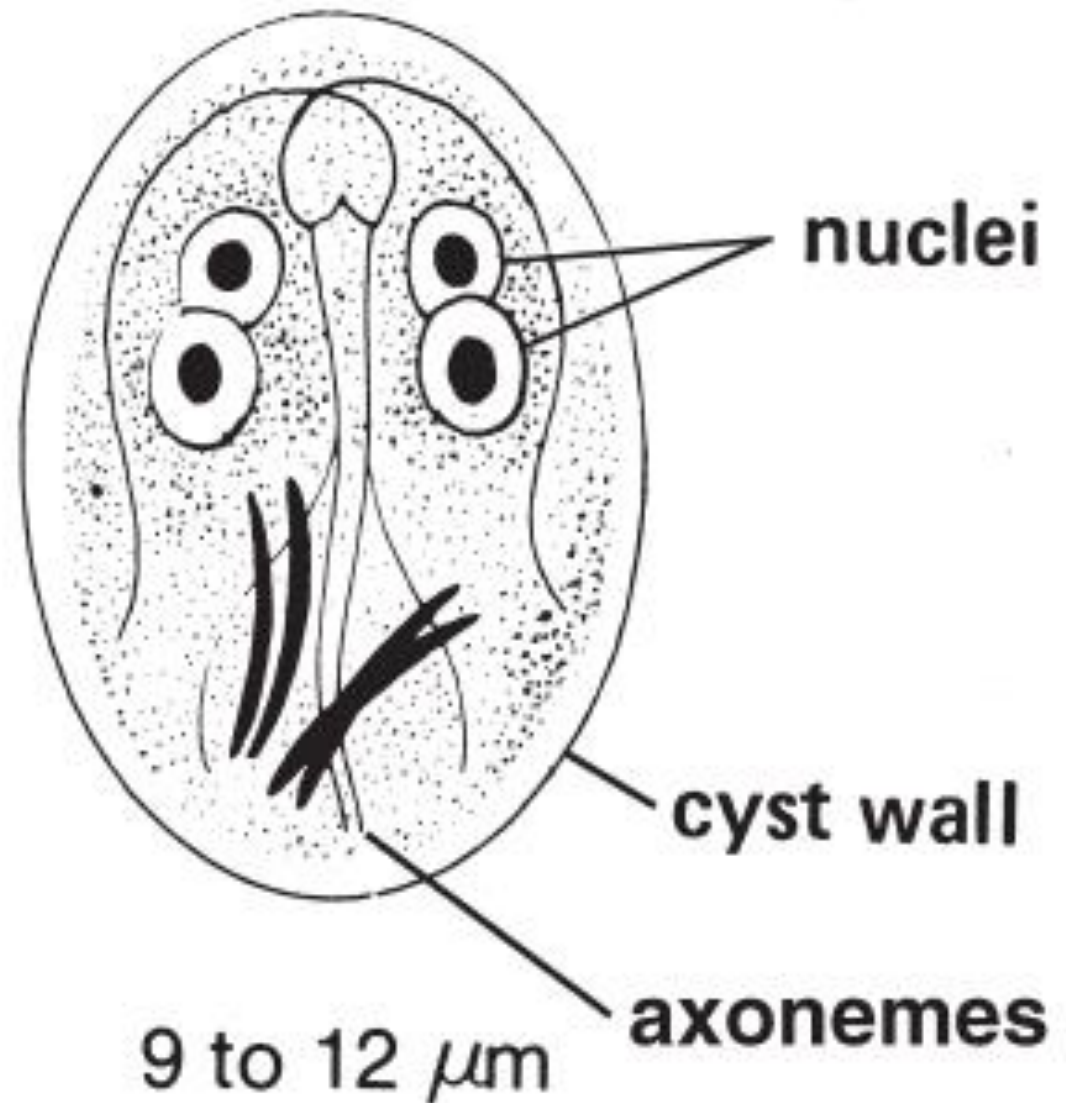
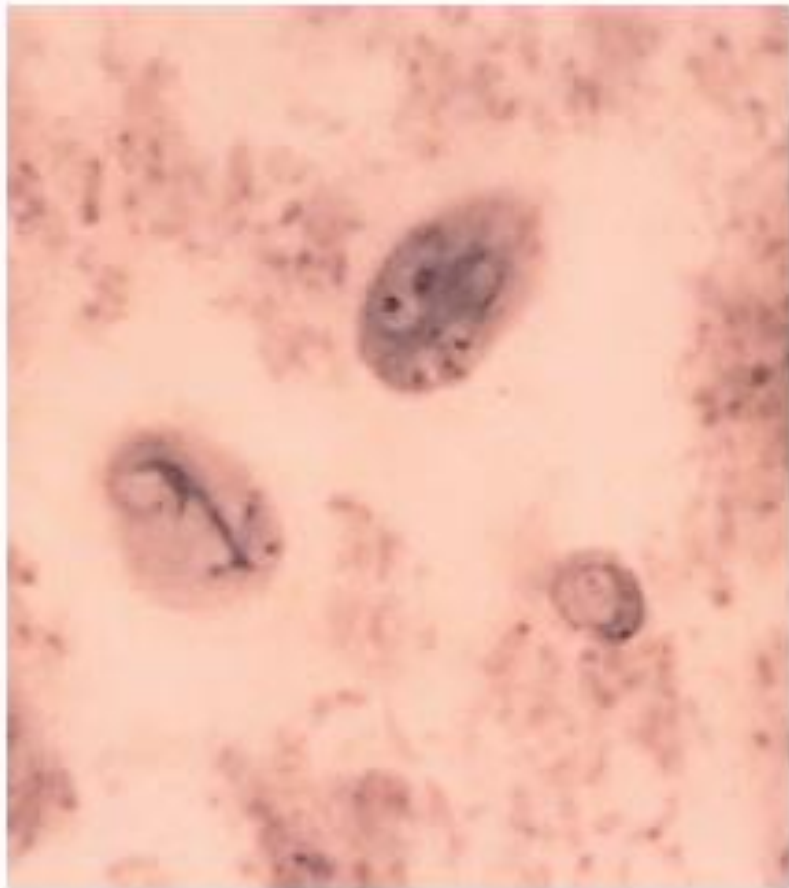
**(a)**



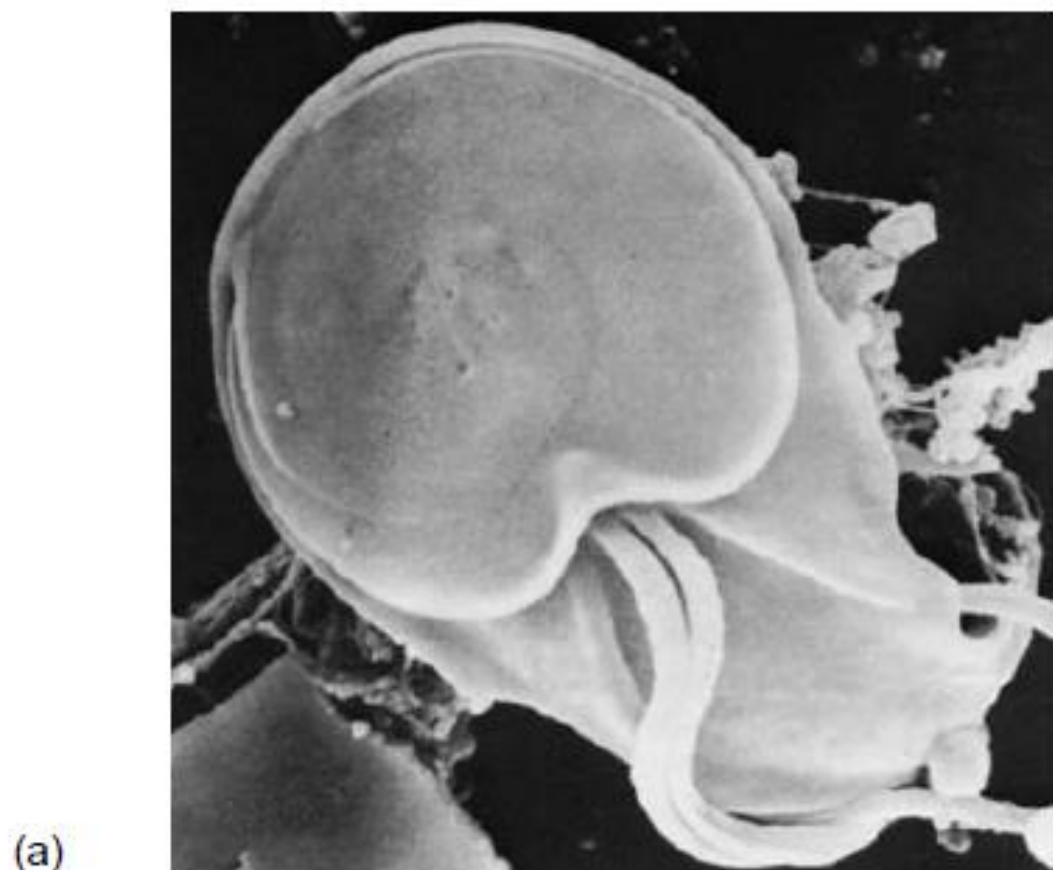
**(b)**



*Giardia lamblia*. (a) Trophozoite. (b) Cyst.



**GIARDIA LAMBLIA CYST**



(a)



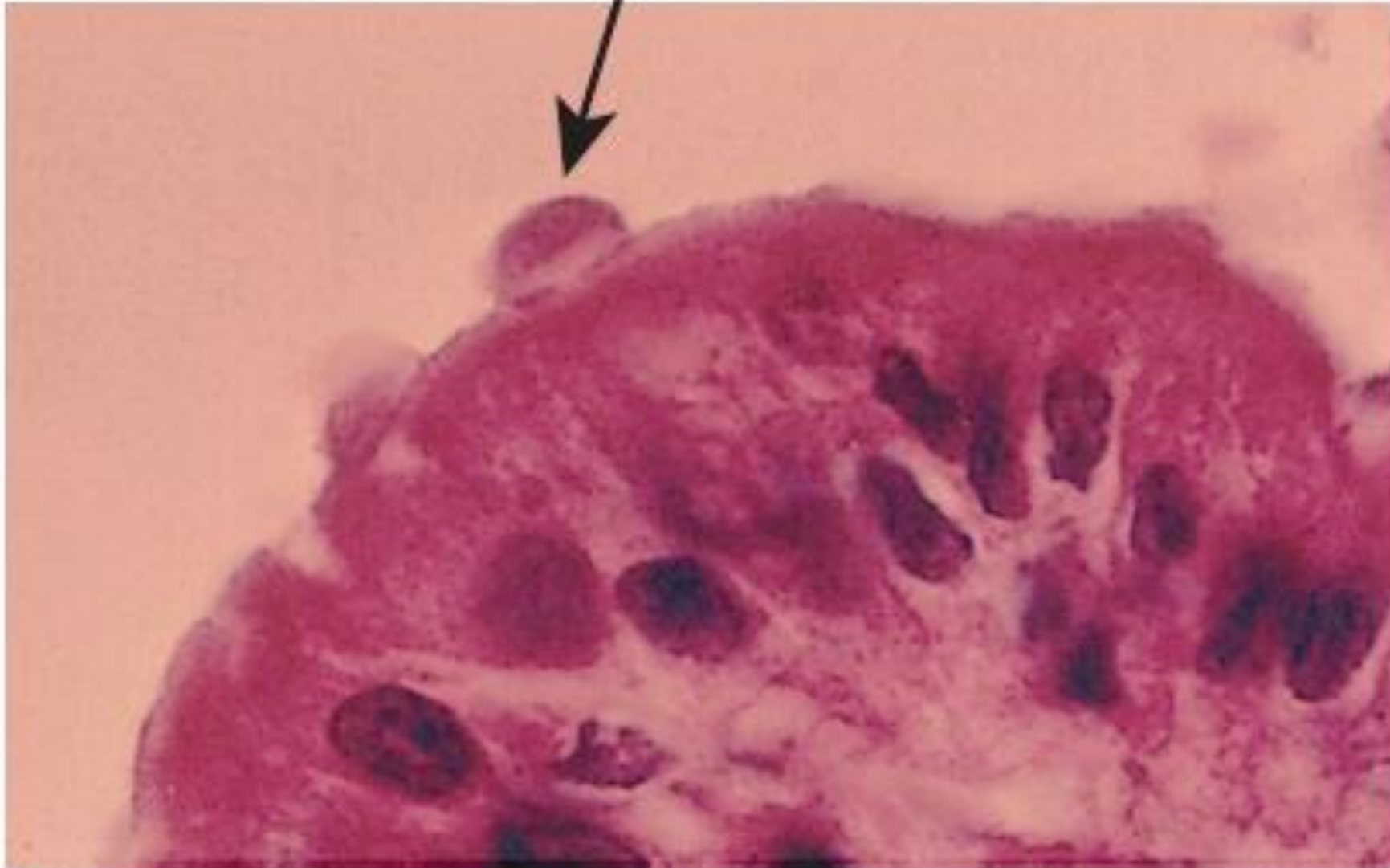
(b)

**Figure 6.6** Scanning electron micrograph of a *Giardia* species.

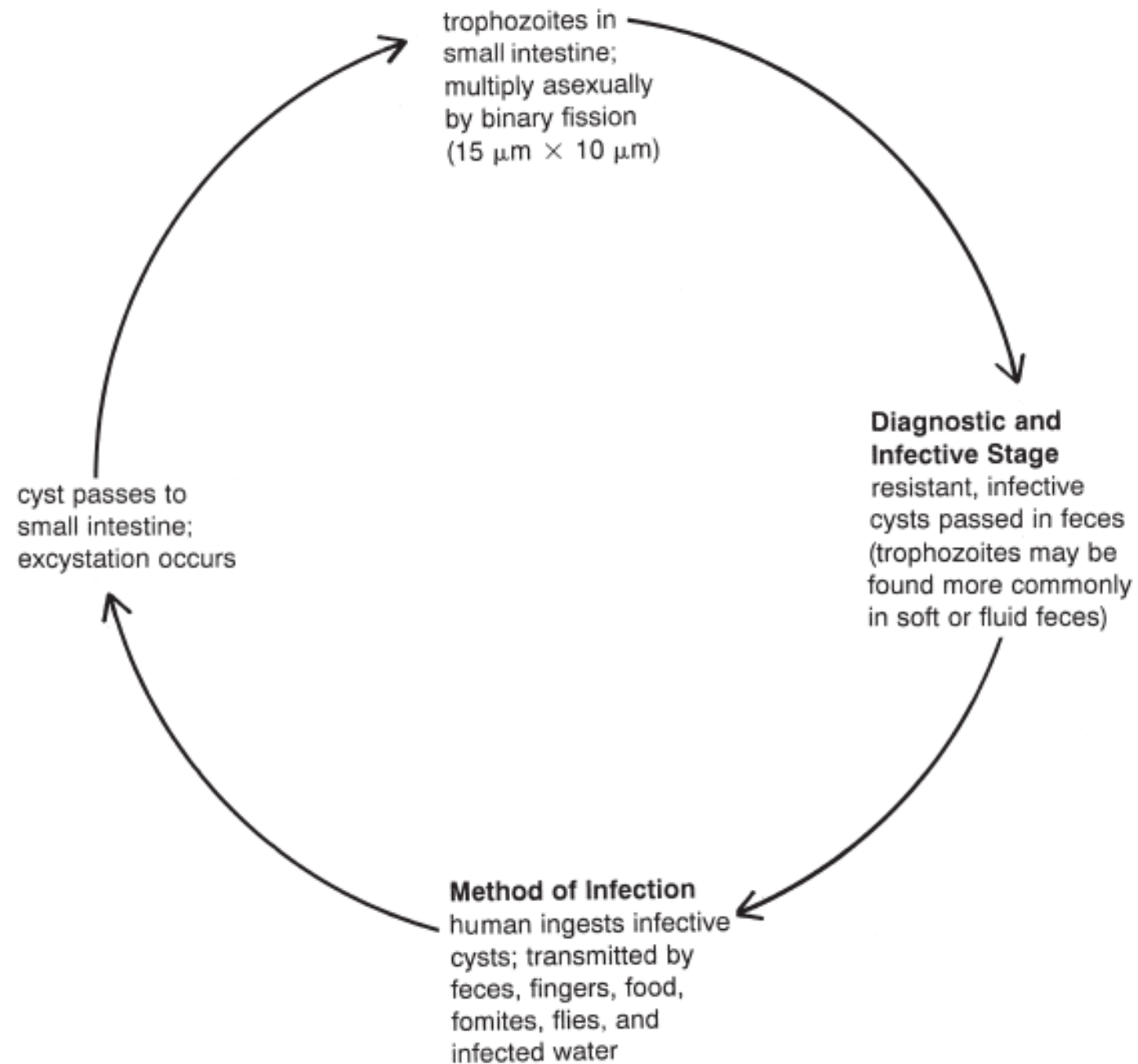
(a) The ventral view shows the flat adhesive disc and the relationship of the ventral and posterior flagella and ventral groove, but the caudal flagella curve around to the other side in this photograph. (b) The dorsal view shows these flagella, as well as the anterior flagella. The organism is 12  $\mu\text{m}$  to 15  $\mu\text{m}$  long.



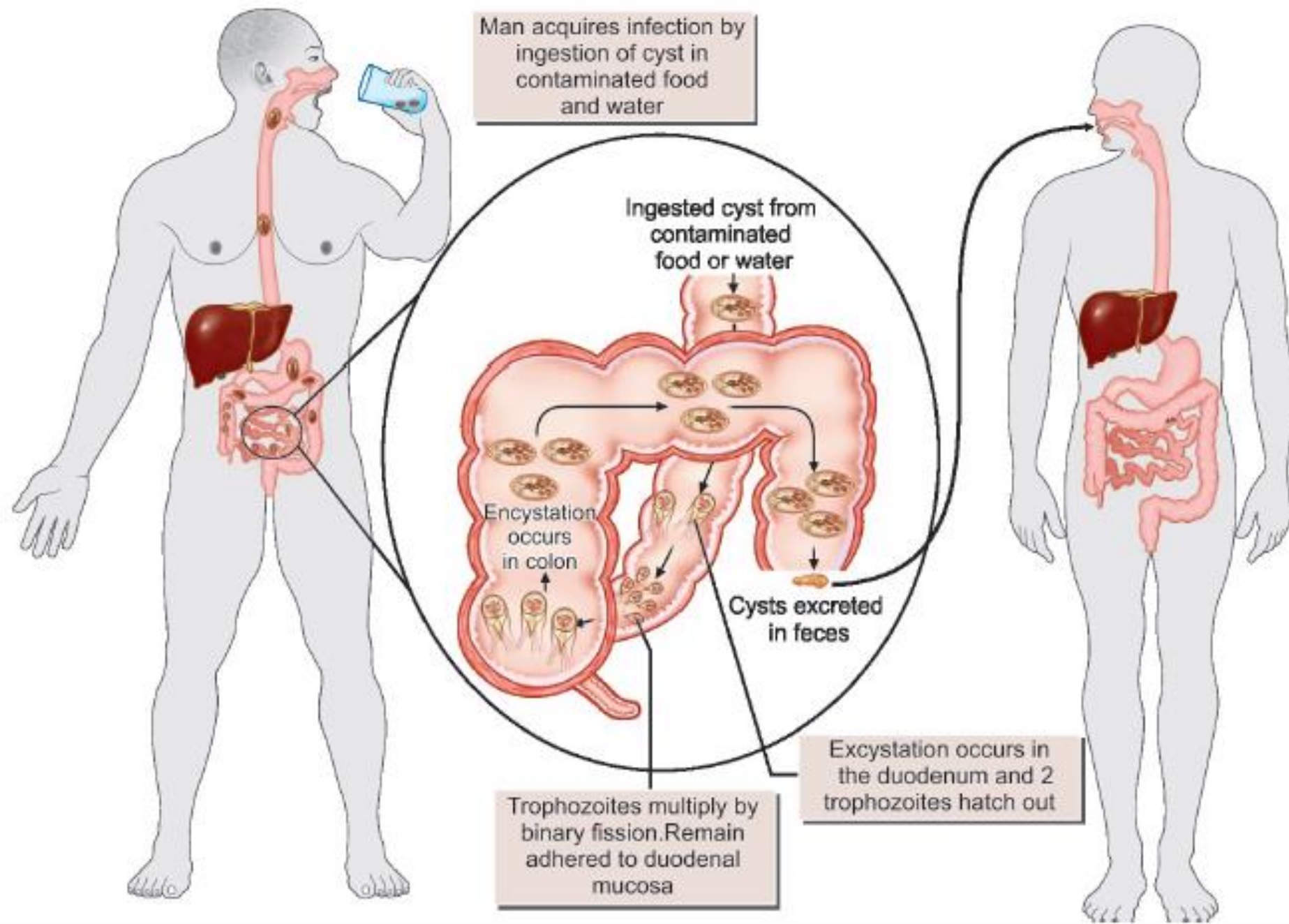
Giardia lamblia



Intestinal wall cross-section

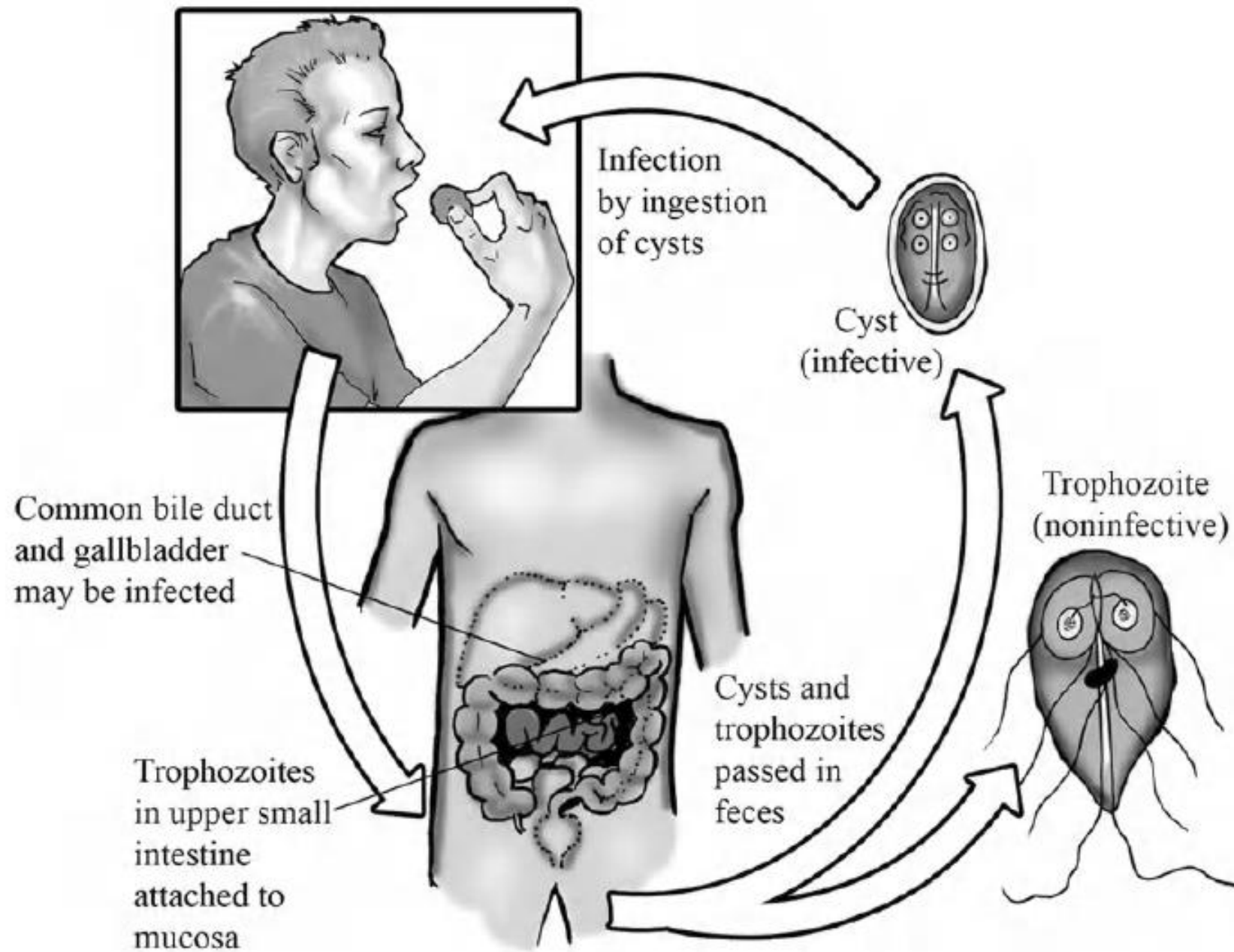


## LIFE CYCLE OF GIARDIA LAMBLIA



**Fig. 4.3:** Life cycle of *Giardia lamblia*



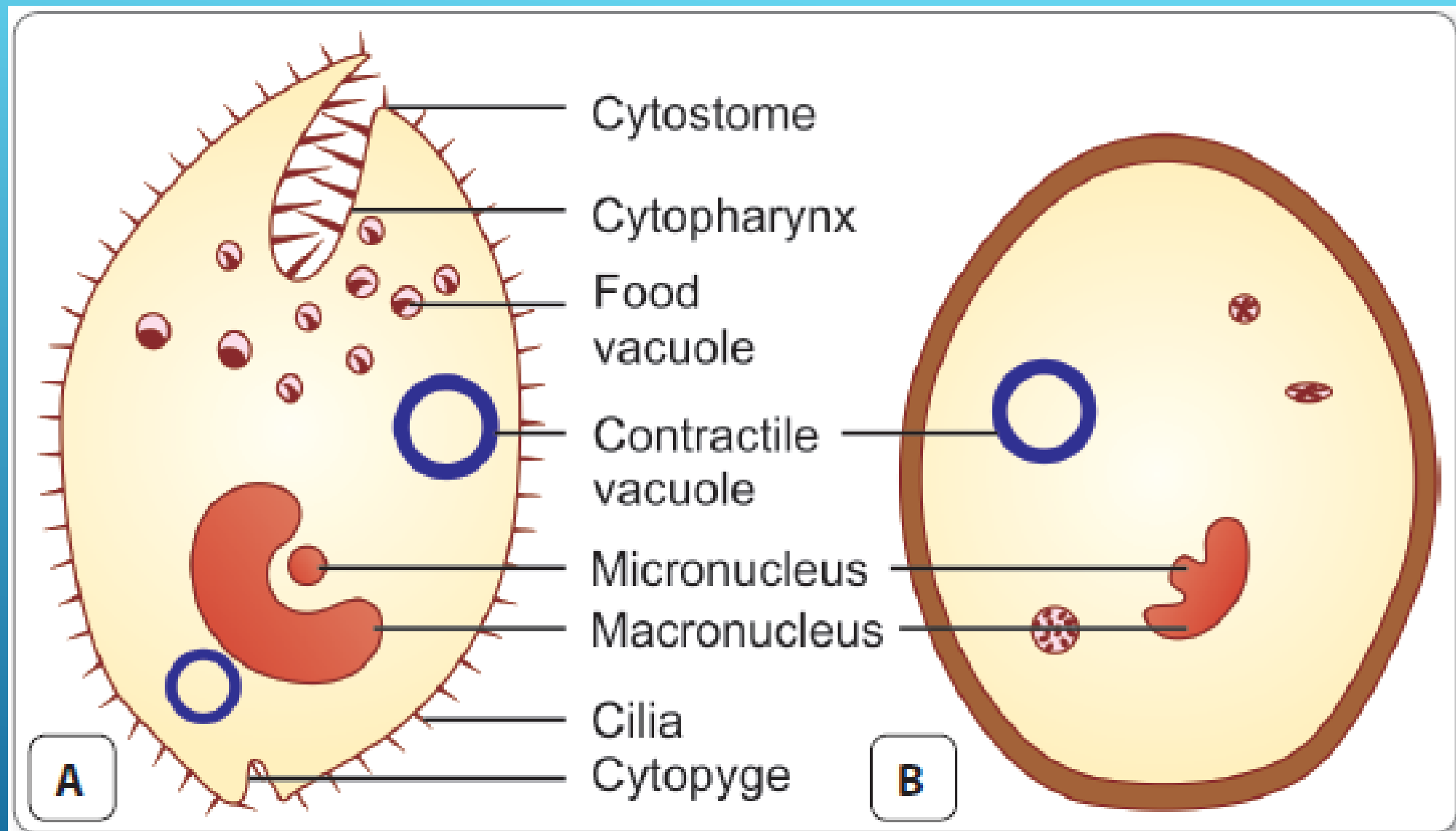


## LIFE CYCLE OF GIARDIA LAMBLIA

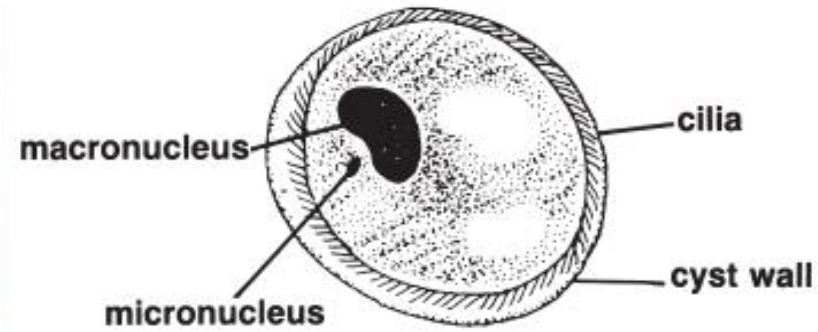
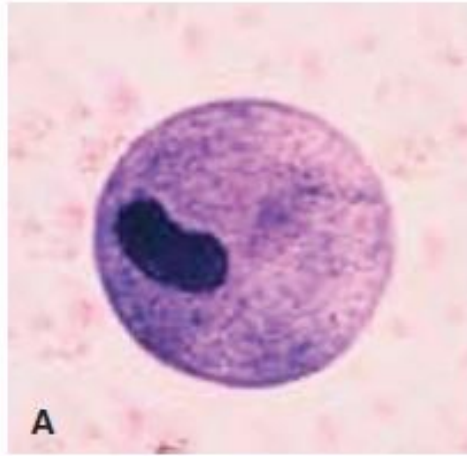


# BALANTIDIUM COLI

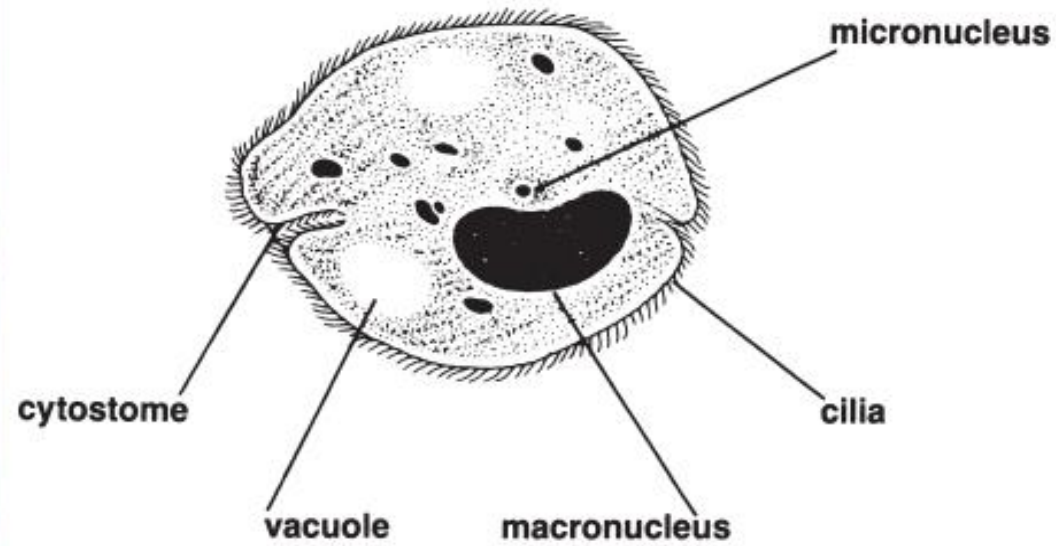
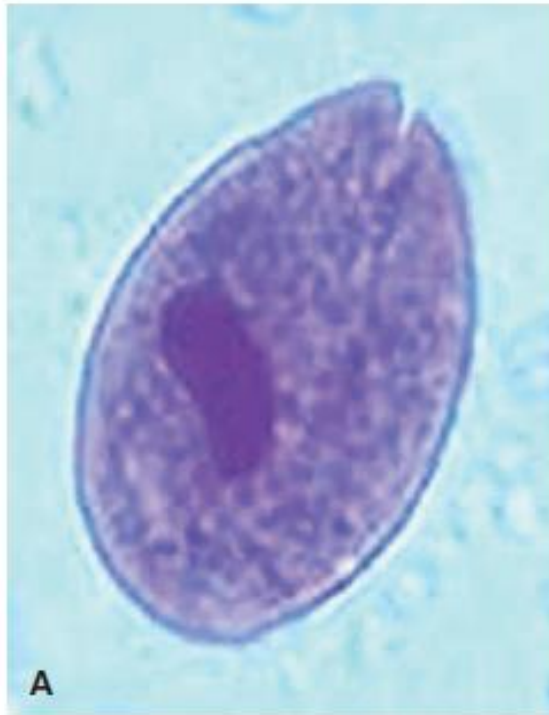




**Fig. 10.1:** Morphology of *Balantidium coli*. **A.** Trophozoites; **B.** Cyst

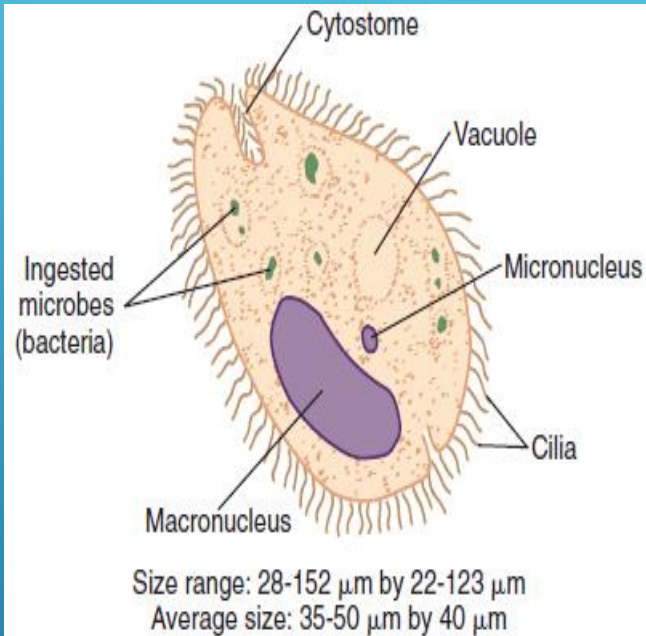


40 to 50  $\mu\text{m}$

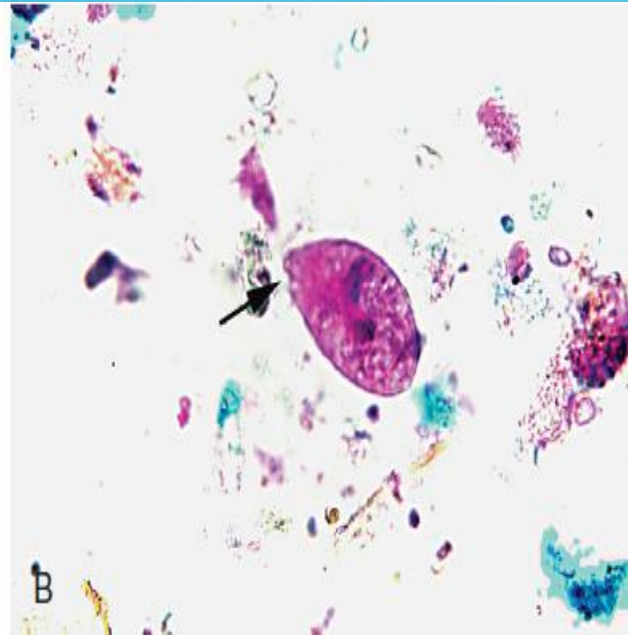


60  $\mu\text{m}$   $\times$  40  $\mu\text{m}$

# **BALANTIDIUM COLI**



## BALANTIDIUM COLI TROPHOZOITE

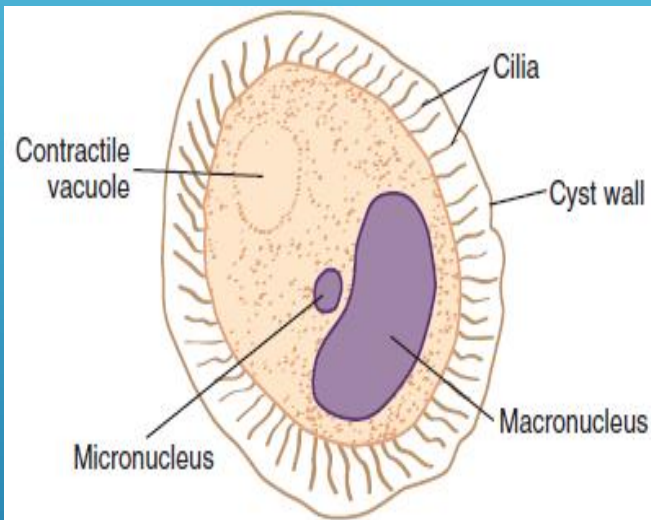


**TABLE 7-1**

### *Balantidium coli* Trophozoite: Typical Characteristics at a Glance

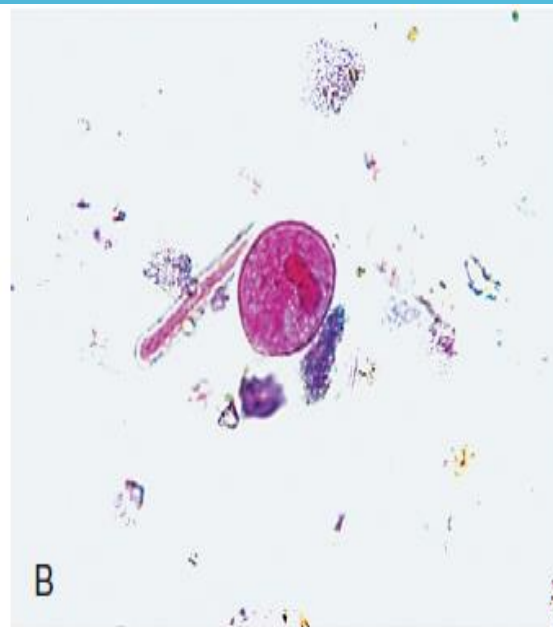
Parameter	Description
Size range	28-152 $\mu\text{m}$ in length, 22-123 $\mu\text{m}$ wide
Motility	Rotary, boring
Number of nuclei	Two Kidney-shaped macronucleus Small spherical micronucleus
Other features	One or two visible contractile vacuoles Cytoplasm may contain food vacuoles and/or bacteria Small cytostome present Layer of cilia around organism





Size range: 43-66  $\mu\text{m}$   
Average size: 52-55  $\mu\text{m}$

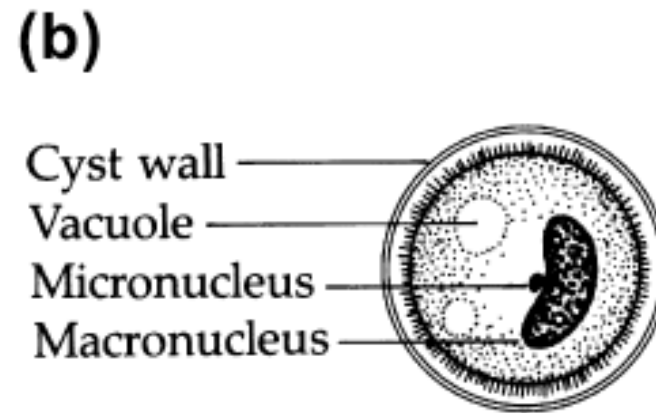
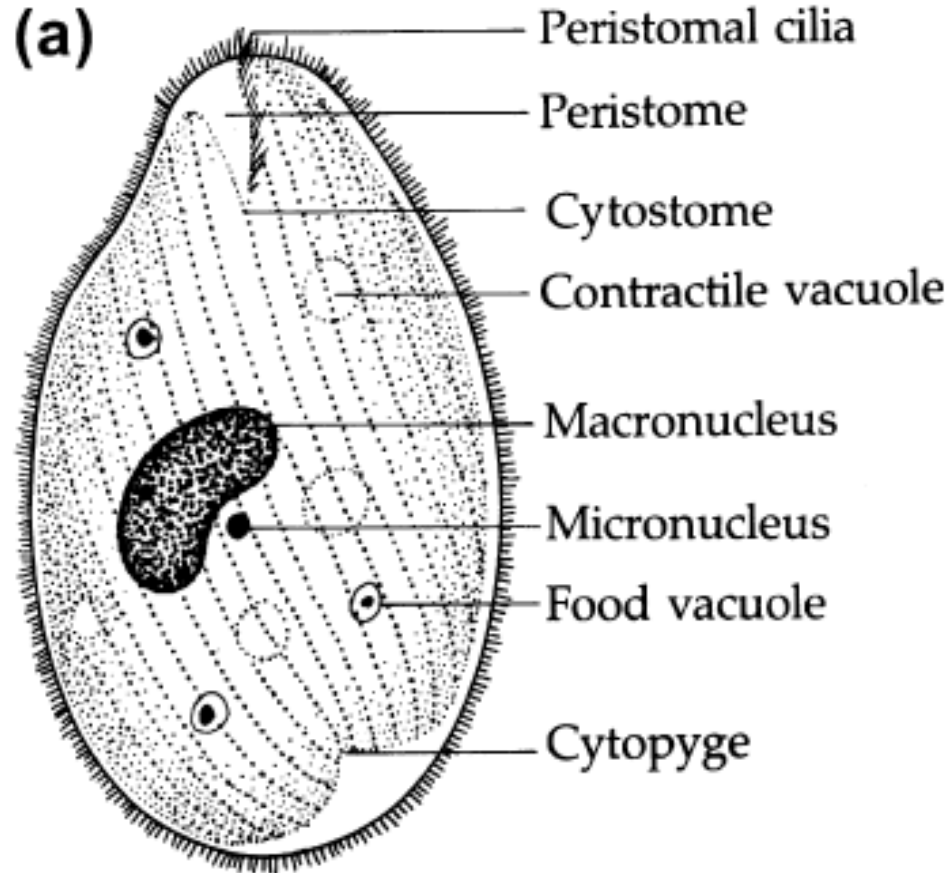
## BALANTIDIUM COLI CYST



**TABLE 7-2**

### *Balantidium coli* Cyst: Typical Characteristics at a Glance\*

Parameter	Description
Size range	43-66 $\mu\text{m}$
Number and appearance of nuclei	Two Kidney-shaped macronucleus usually present Small spherical micronucleus; may not be observable
Other features	One or two visible contractile vacuoles in young cysts Double cyst wall Row of cilia visible in between cyst wall layers of young cysts



*Balantidium coli*, an intestinal parasite of pigs, monkeys, and humans. Trophozoite. (b) Cyst.

**BALANTIDIUM COLI**

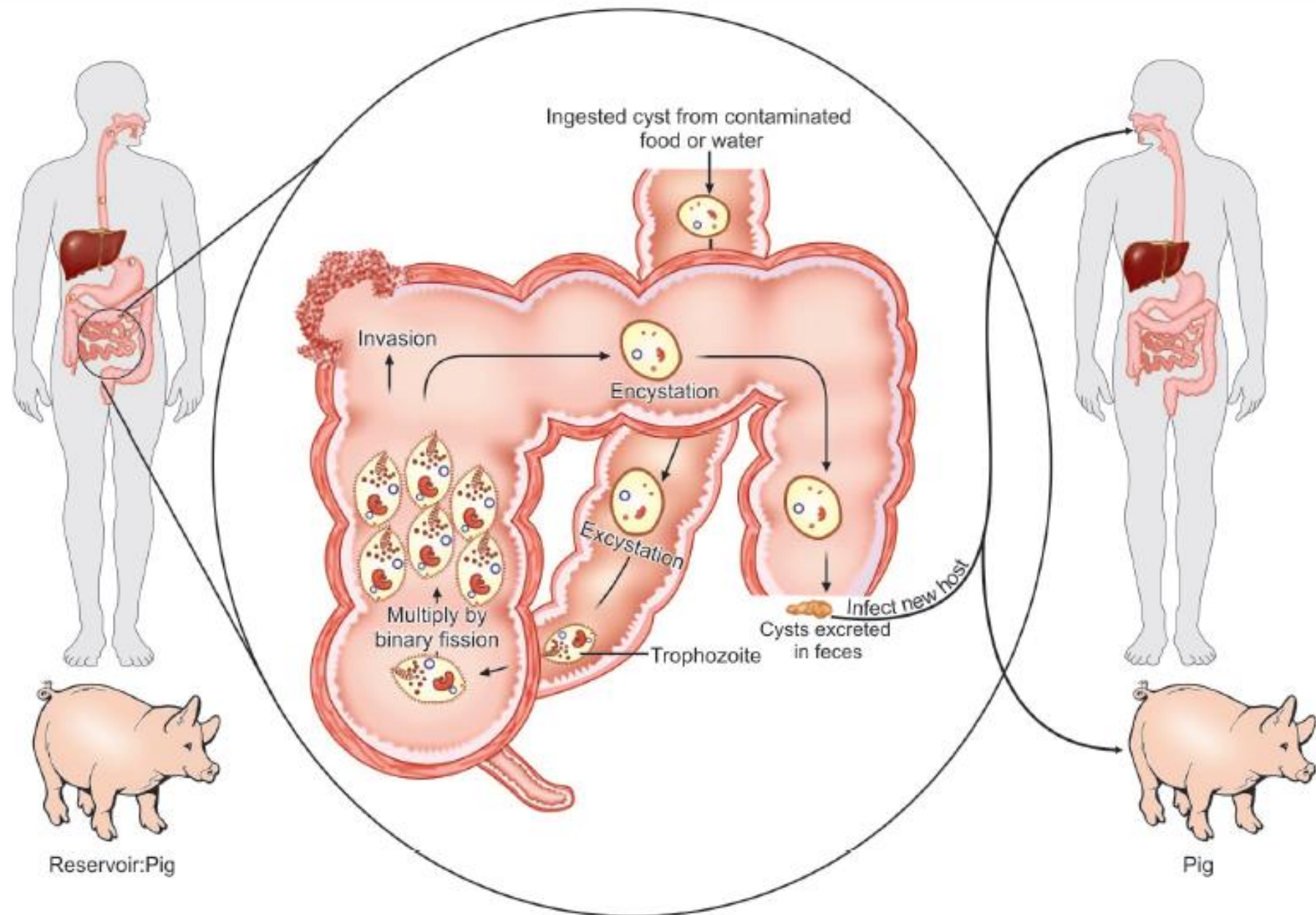
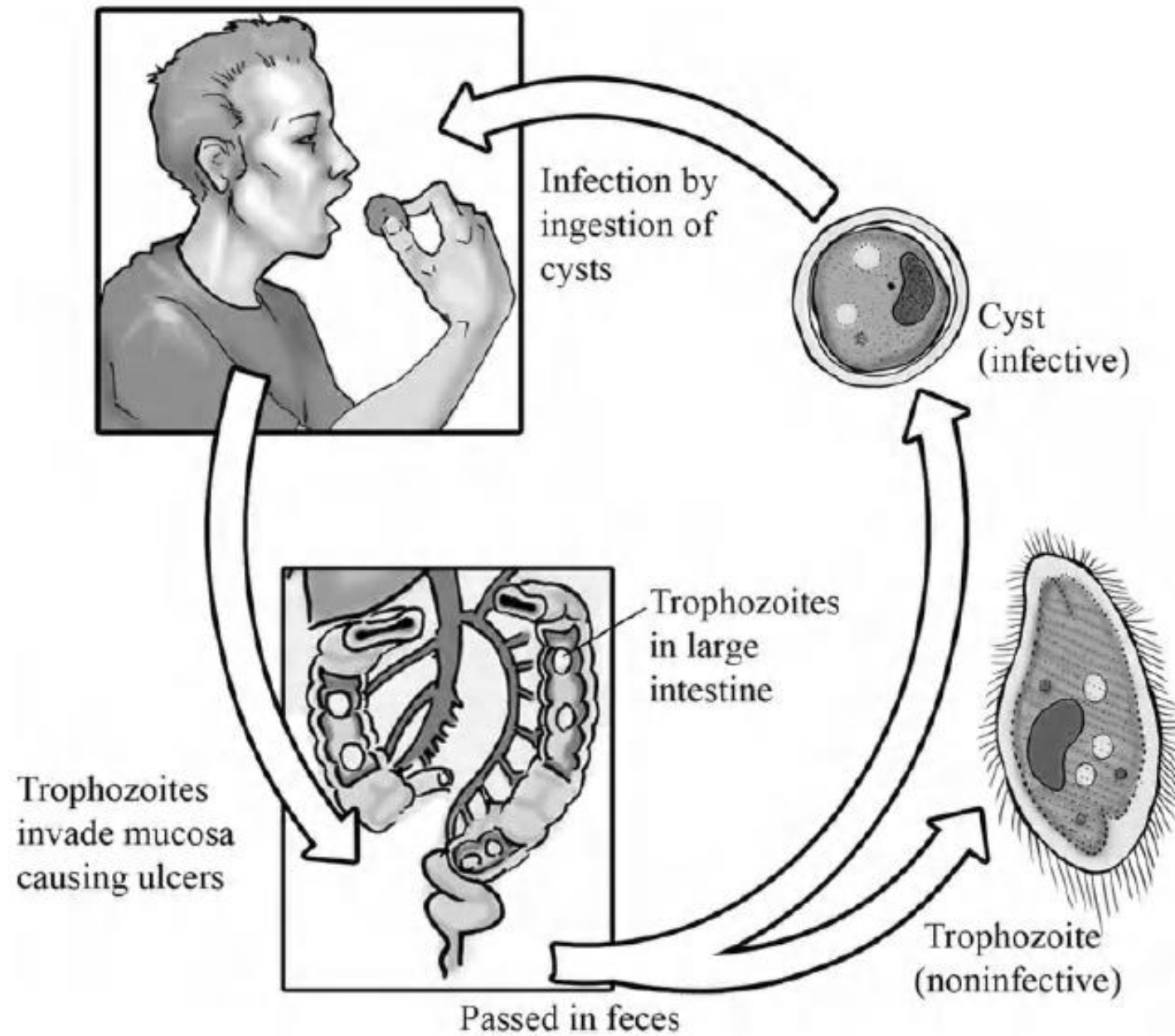


Fig. 10.2: Life cycle of *Balantidium coli*

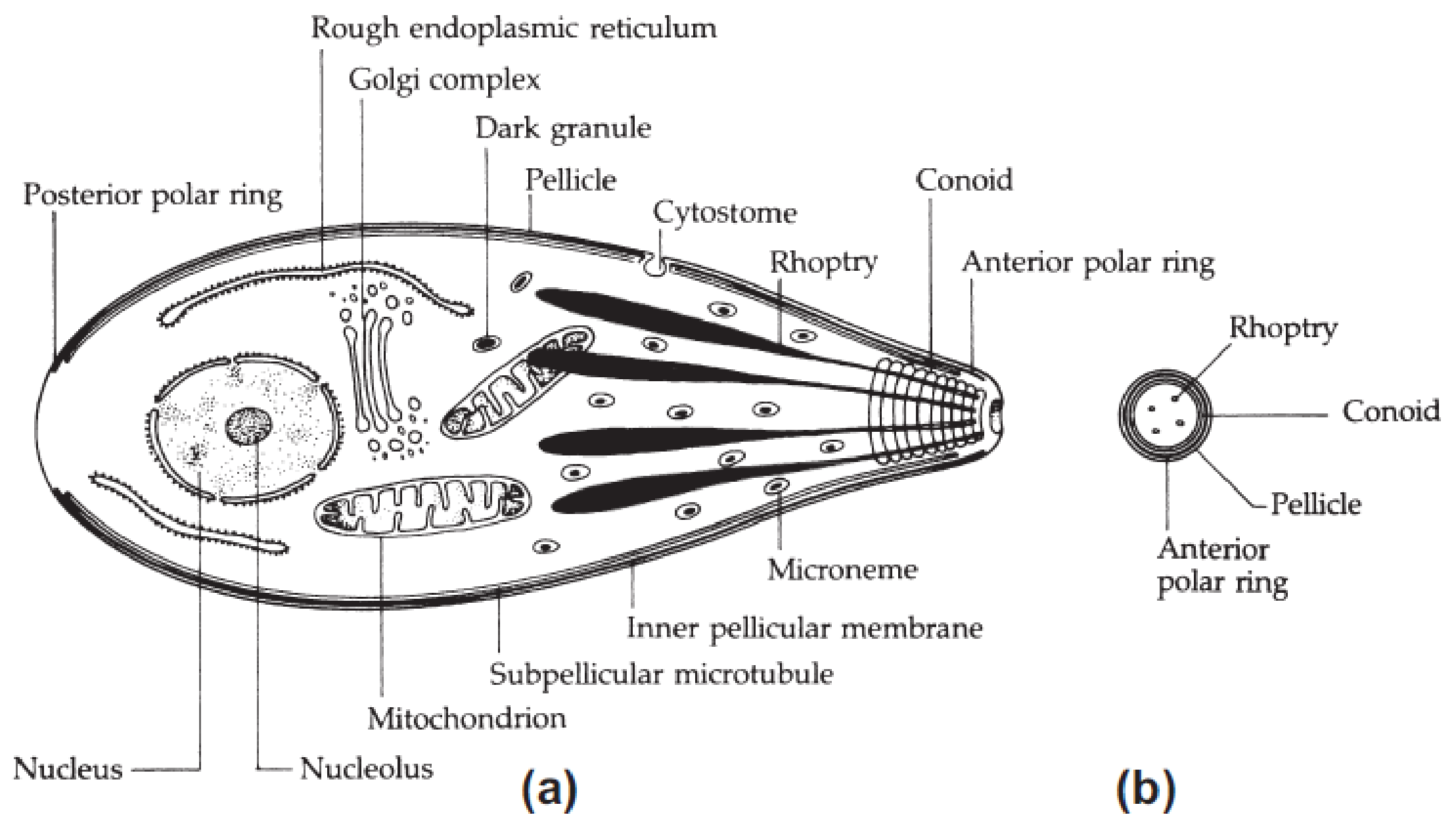



**LIFE CYCLE OF BALANTIDIUM COLI**

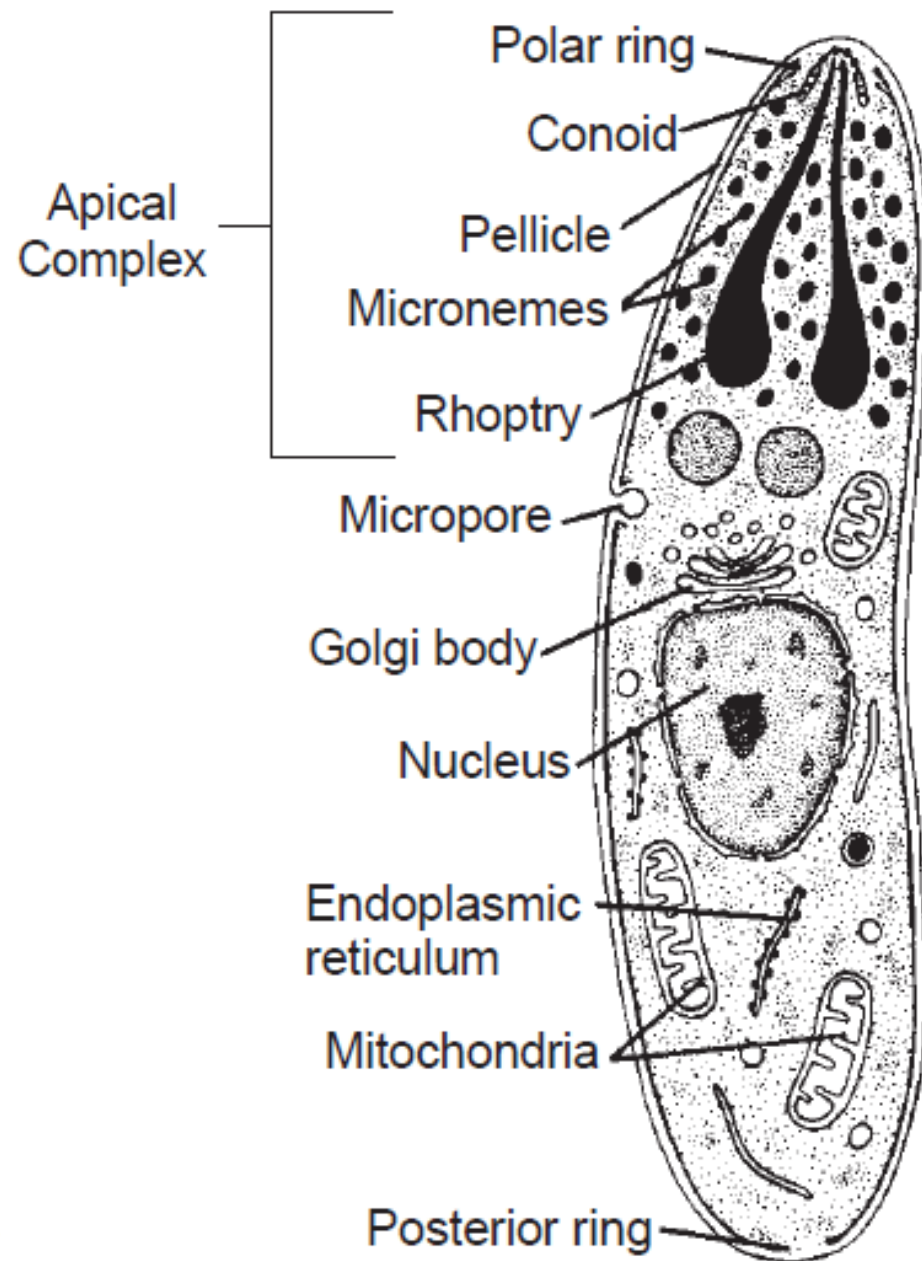


APICOMPLEXA

Decorative white lines consisting of several parallel diagonal strokes extending from the bottom right corner towards the center of the image.



 (a) Apicomplexan sporozoite or merozoite showing constituents of apical complex. (b) Cross section through anterior polar ring.

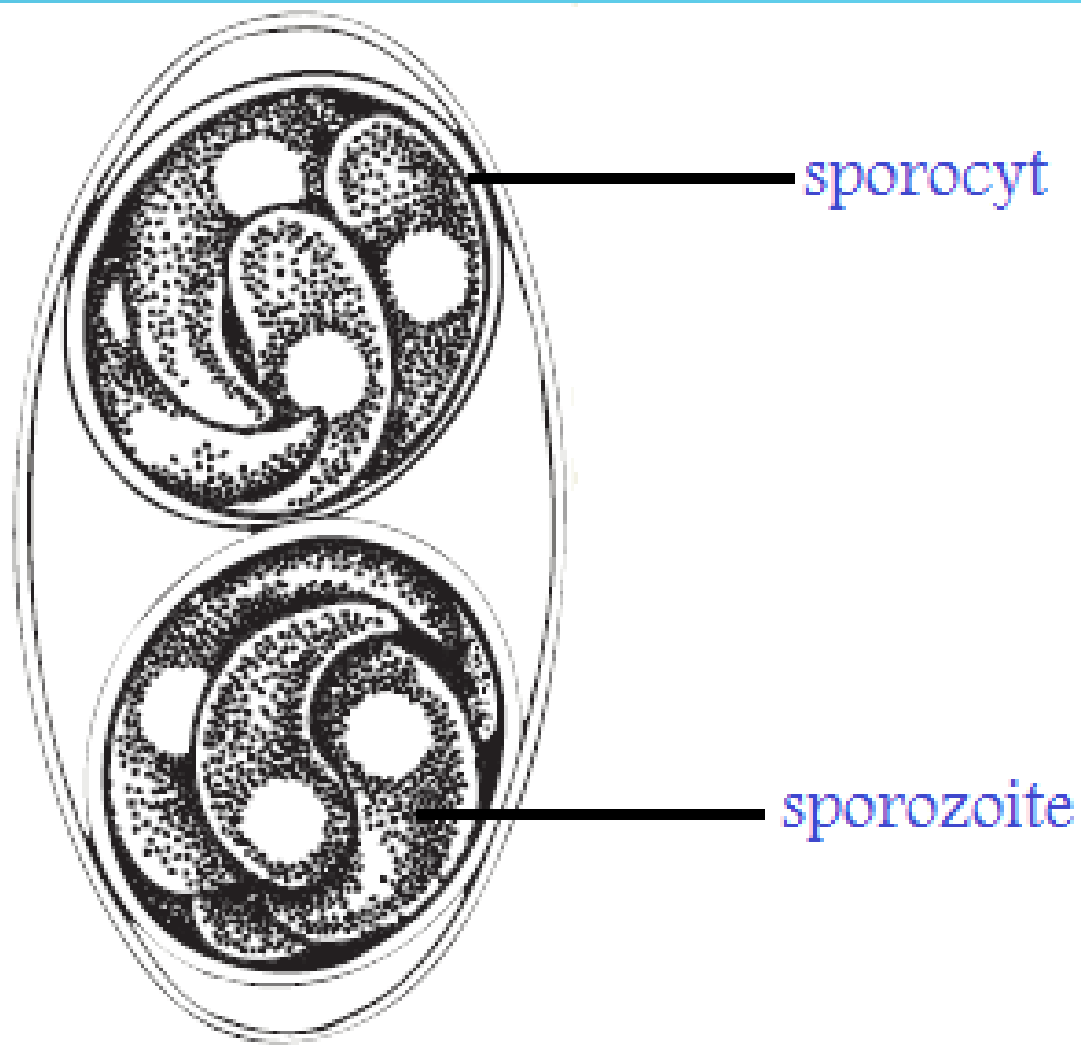


## APICOMPLEXAN STRUCTURE

ISOSPORRA

BELLI



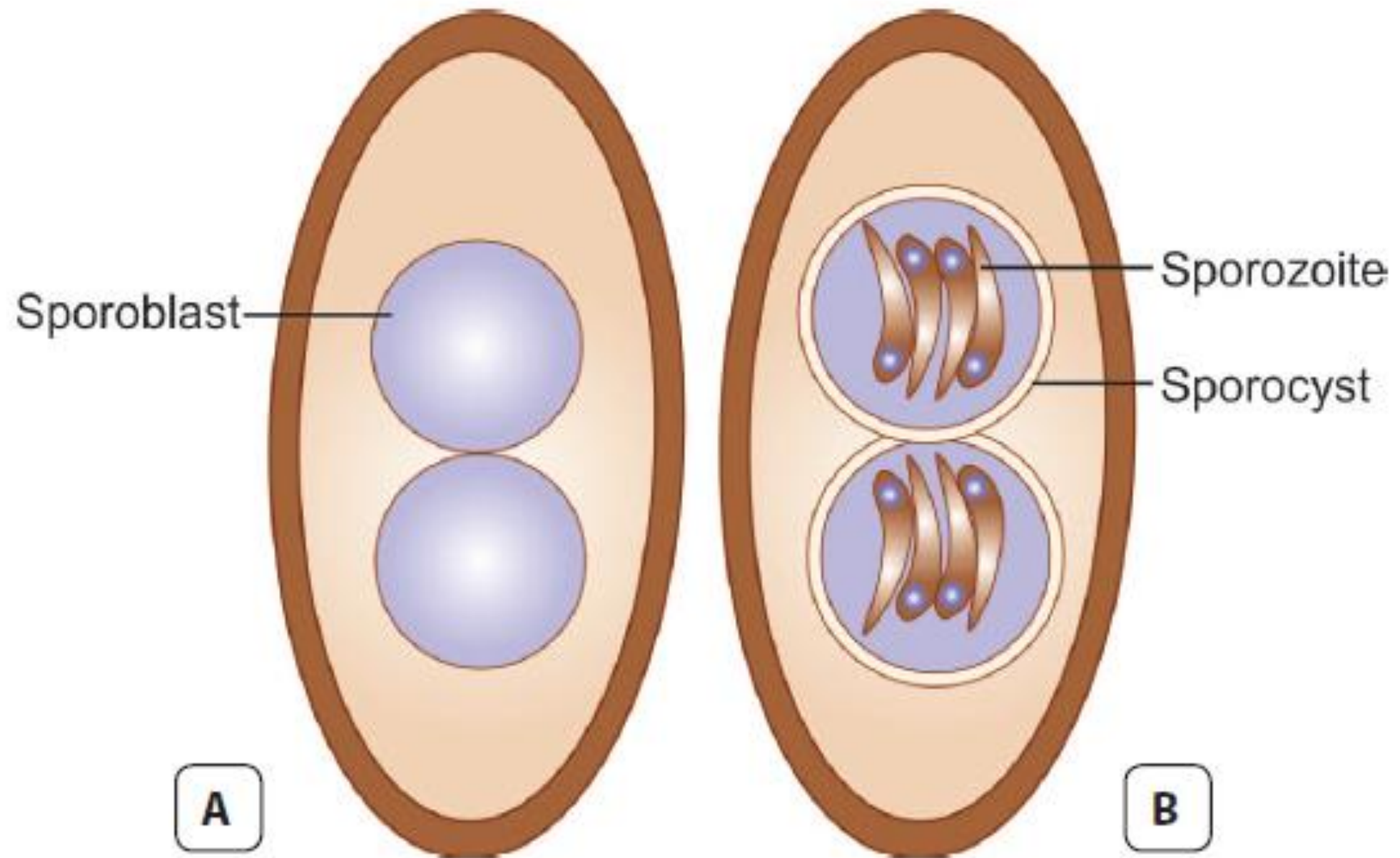


**MATURE OOCYT OF ISOSPORA  
BELLI**

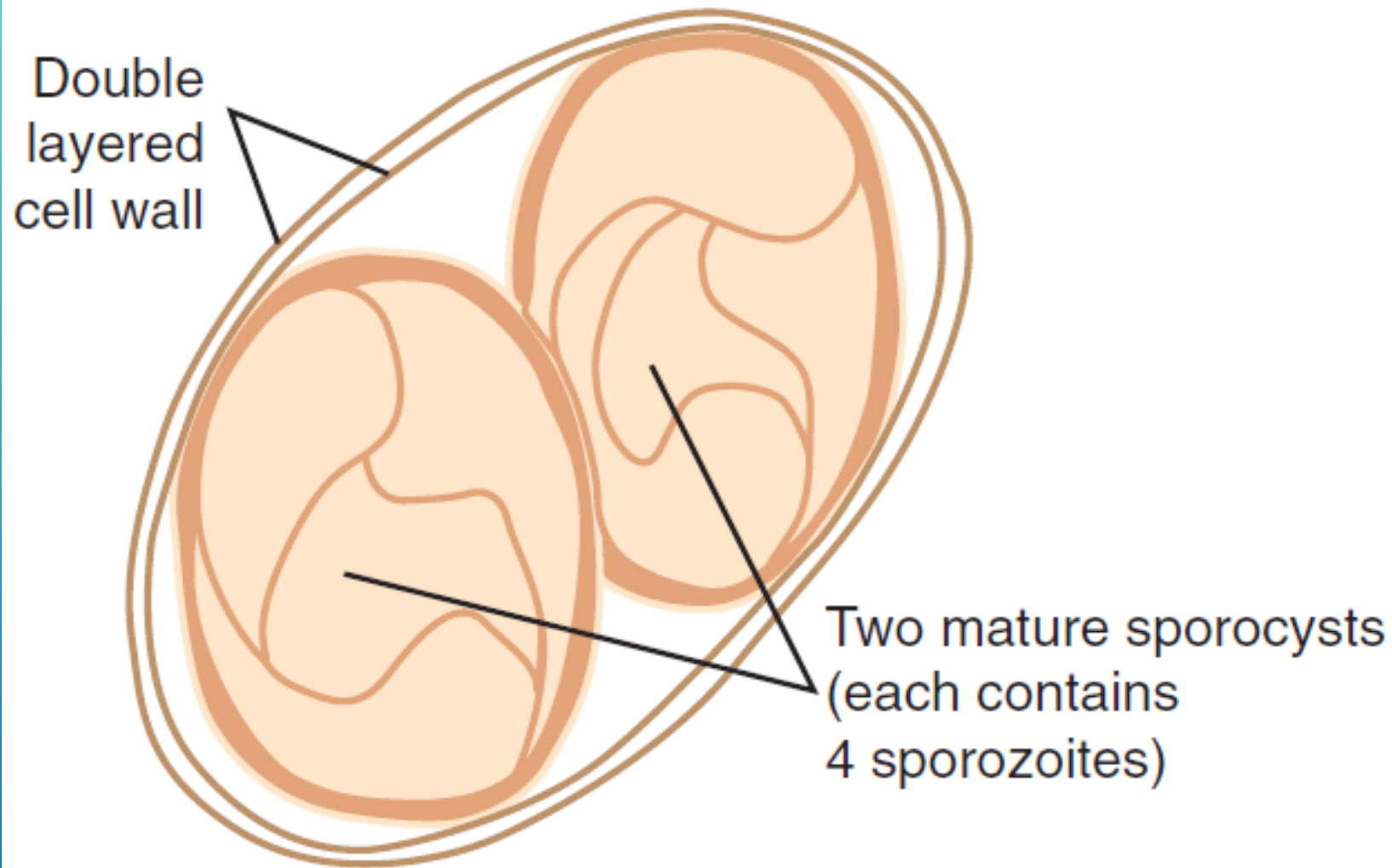
**TABLE 7-3**

***Isospora belli* Oocyst:  
Typical Characteristics at  
a Glance**

Parameter	Description
Size range	25-35 $\mu\text{m}$ long, 10-15 $\mu\text{m}$ wide
Appearance	Transparent
Shape	Oval
Cell wall	Two layered, colorless and smooth
Developing sporoblast	Unicellular with granular cytoplasm
Young oocyst	Two sporoblasts
Mature oocyst	Two sporocysts, each containing four sausage-shaped sporozoites



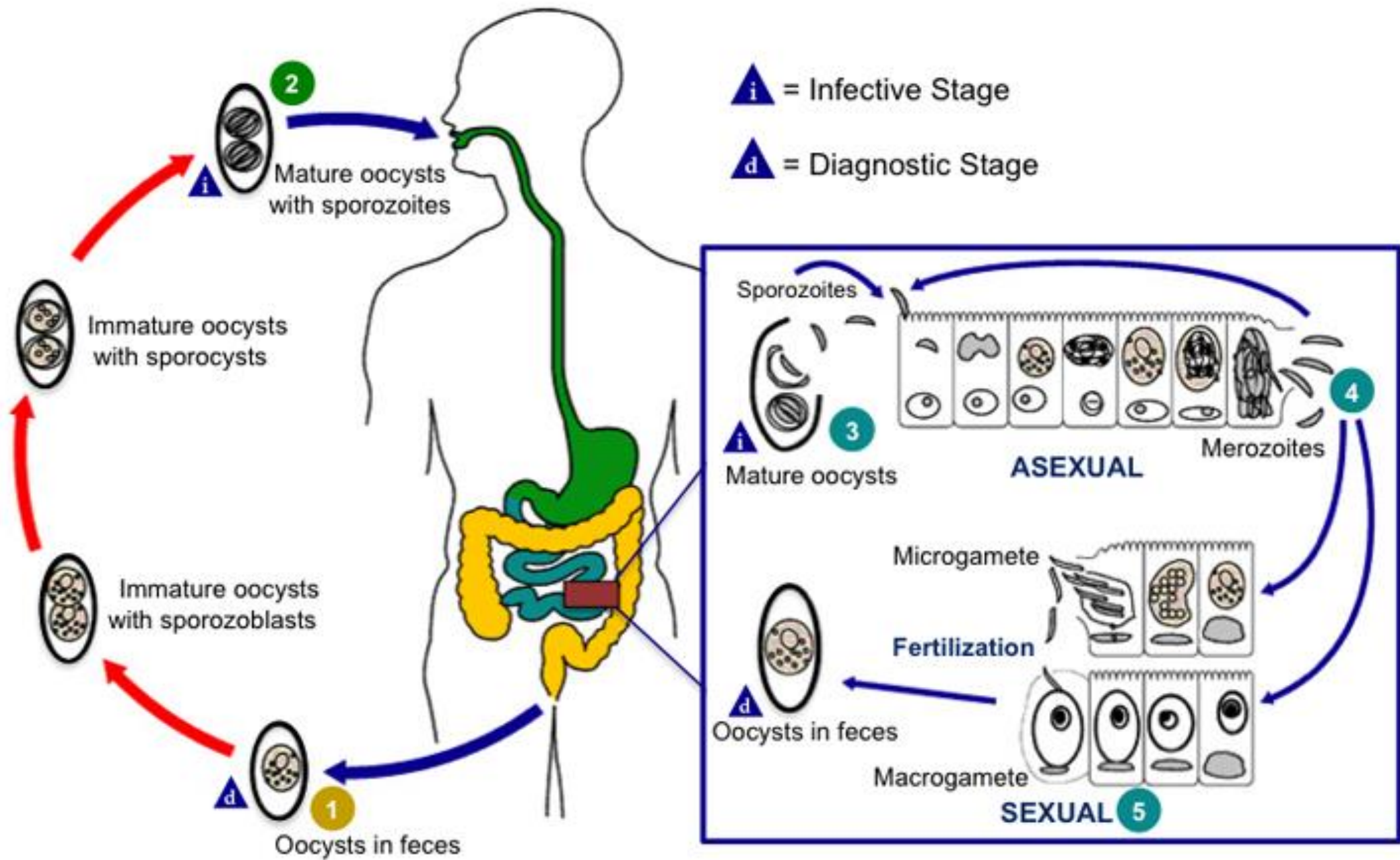
**Fig. 7.5:** Oocysts of *Isospora belli*. **A.** Immature cyst; **B.** Mature cyst



Size range: 25-35  $\mu\text{m}$  by 10-15  $\mu\text{m}$

Average size: 30  $\mu\text{m}$  by 12  $\mu\text{m}$

**ISOSPORA BELLII OOCYST**

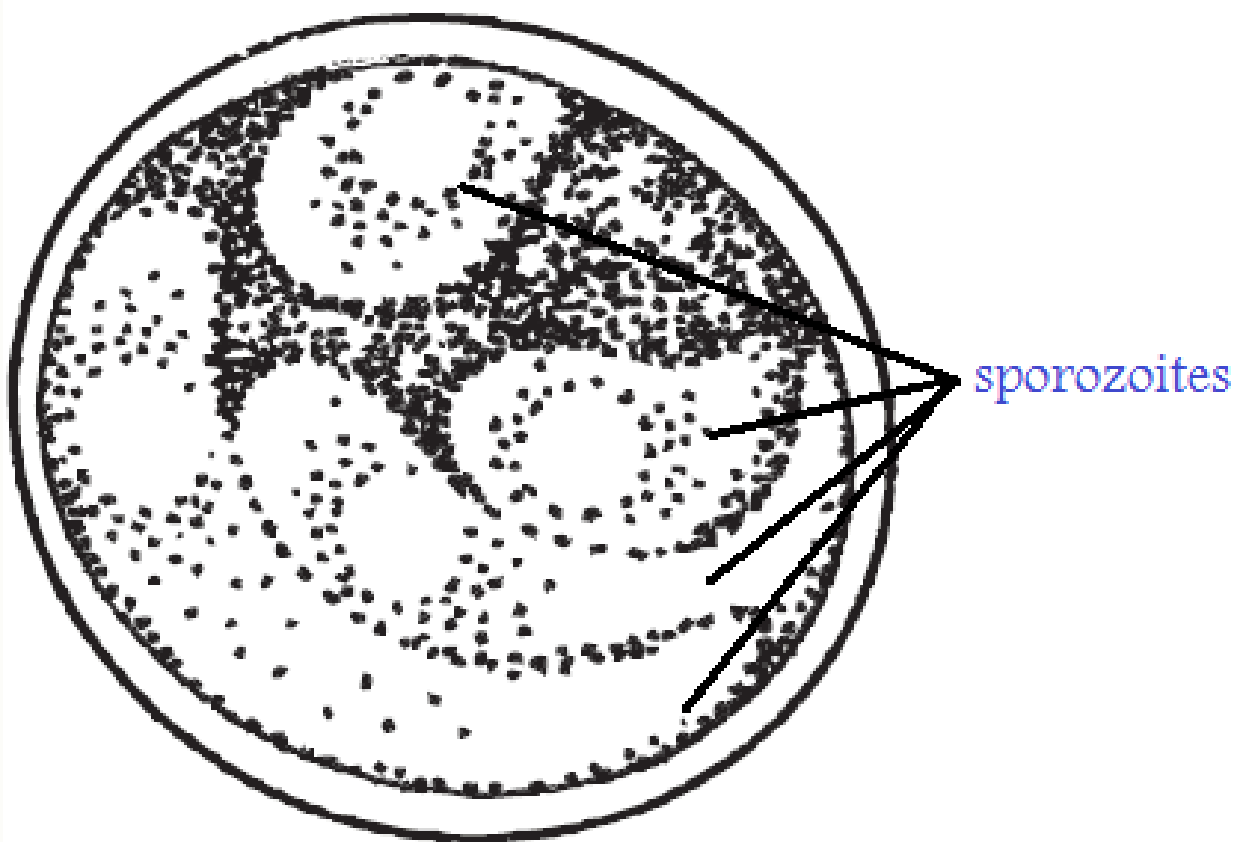


# LIFE CYCLE OF ISOSPORA BELLII



# CRYPTOSPORIDIUM SPECIES



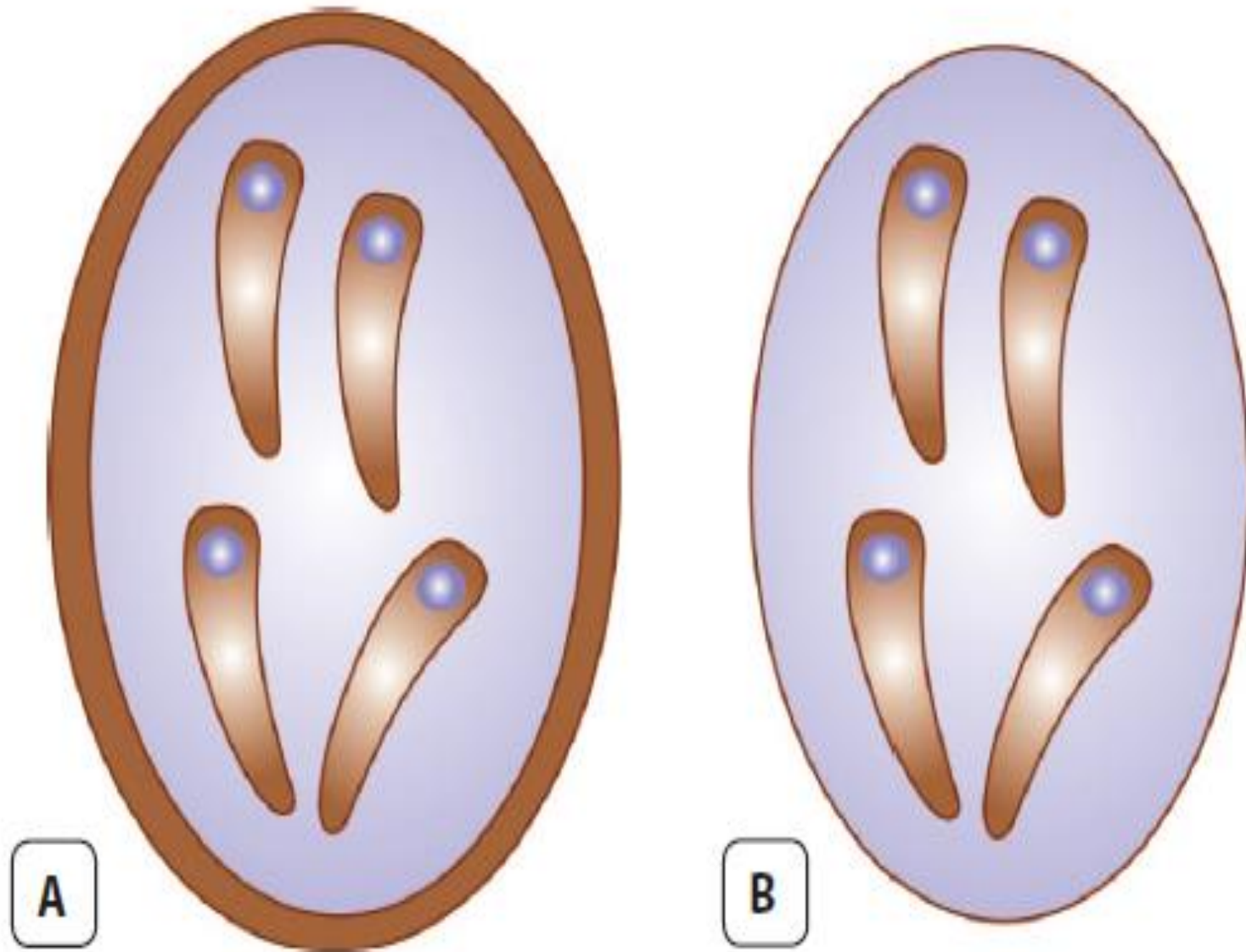


**MATURE OOCYST OF CRYPTOSPORIDIUM**

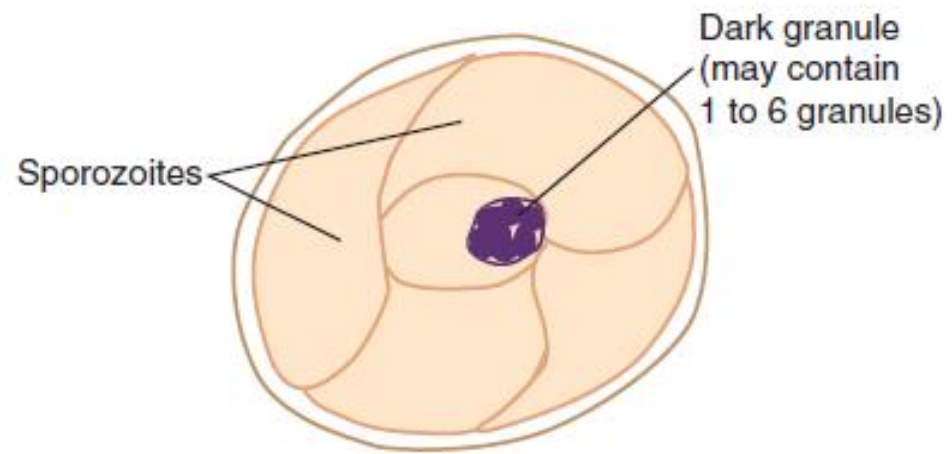
**TABLE 7-5**

***Cryptosporidium parvum*  
Oocyst: Typical  
Characteristics at a Glance**

Parameter	Description
Size	4-6 $\mu\text{m}$
Shape	Roundish
Number of sporocysts	None
Number of sporozoites	Four (small)
Other features	Thick cell wall One to six dark granules may be visible

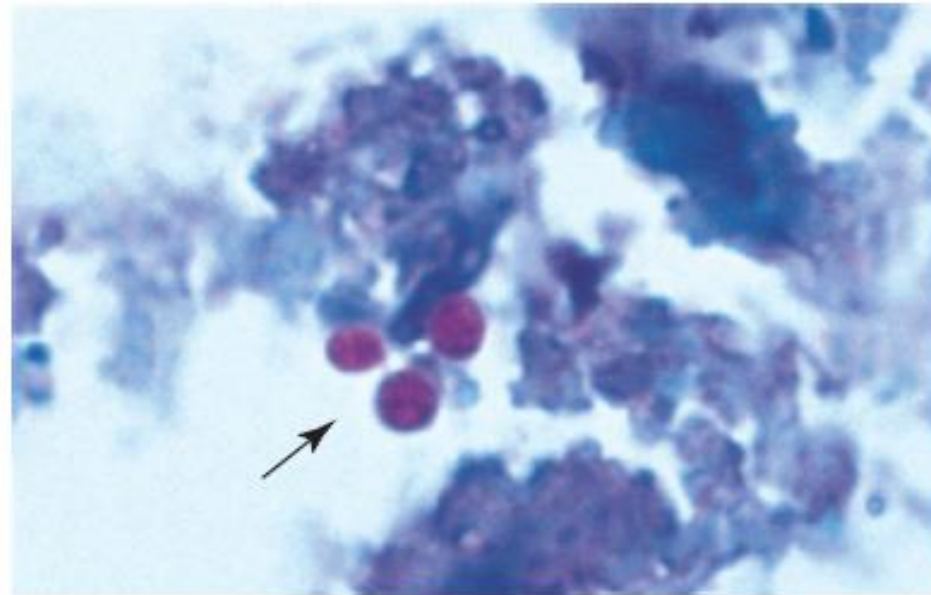


**Fig. 7.7:** Oocysts of *Cryptosporidium parvum*. **A.** Thick-walled oocyst;  
**B.** Thin-walled oocyst



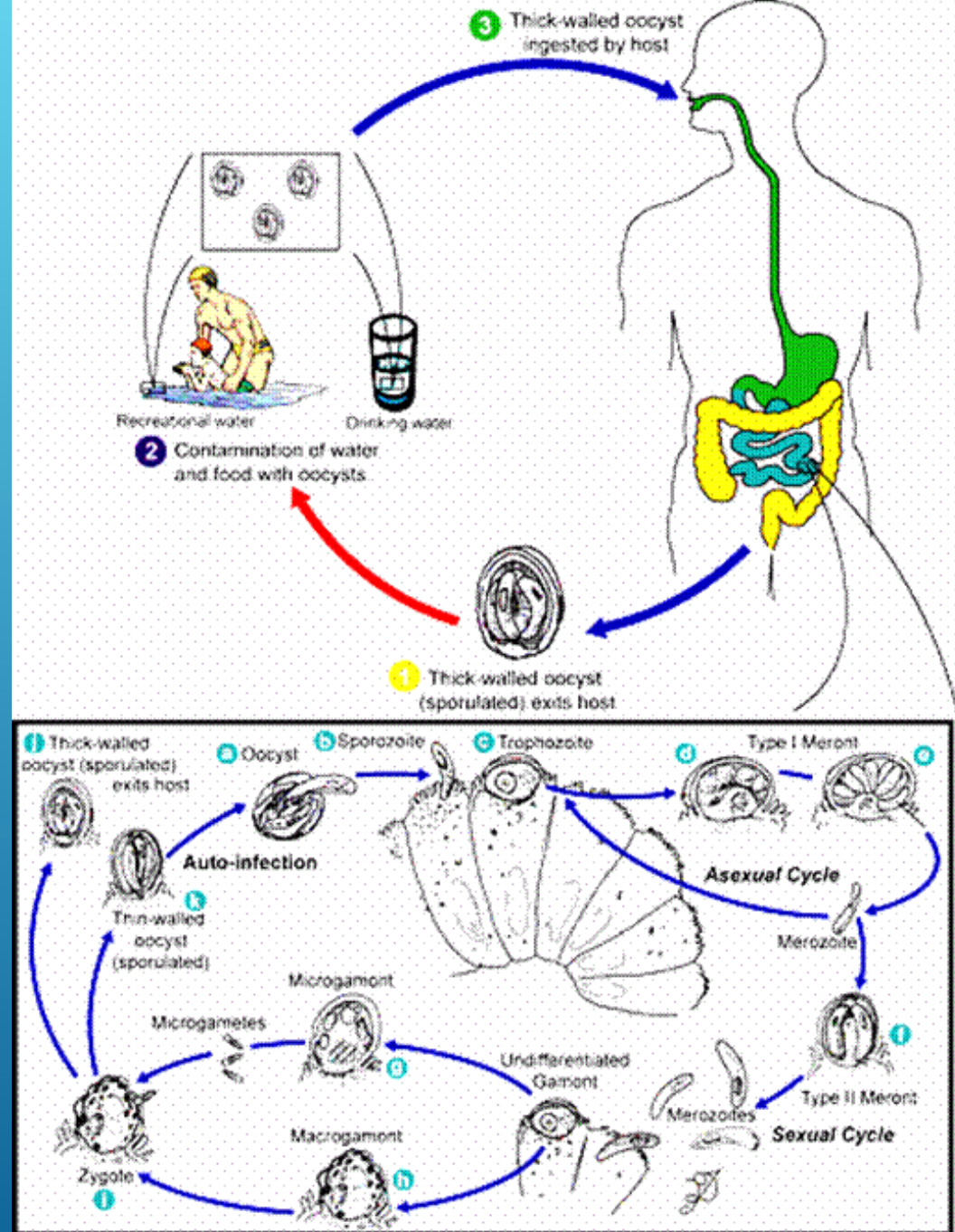
Average size: 4-6  $\mu\text{m}$

**FIGURE 7-9** *Cryptosporidium parvum* oocyst.

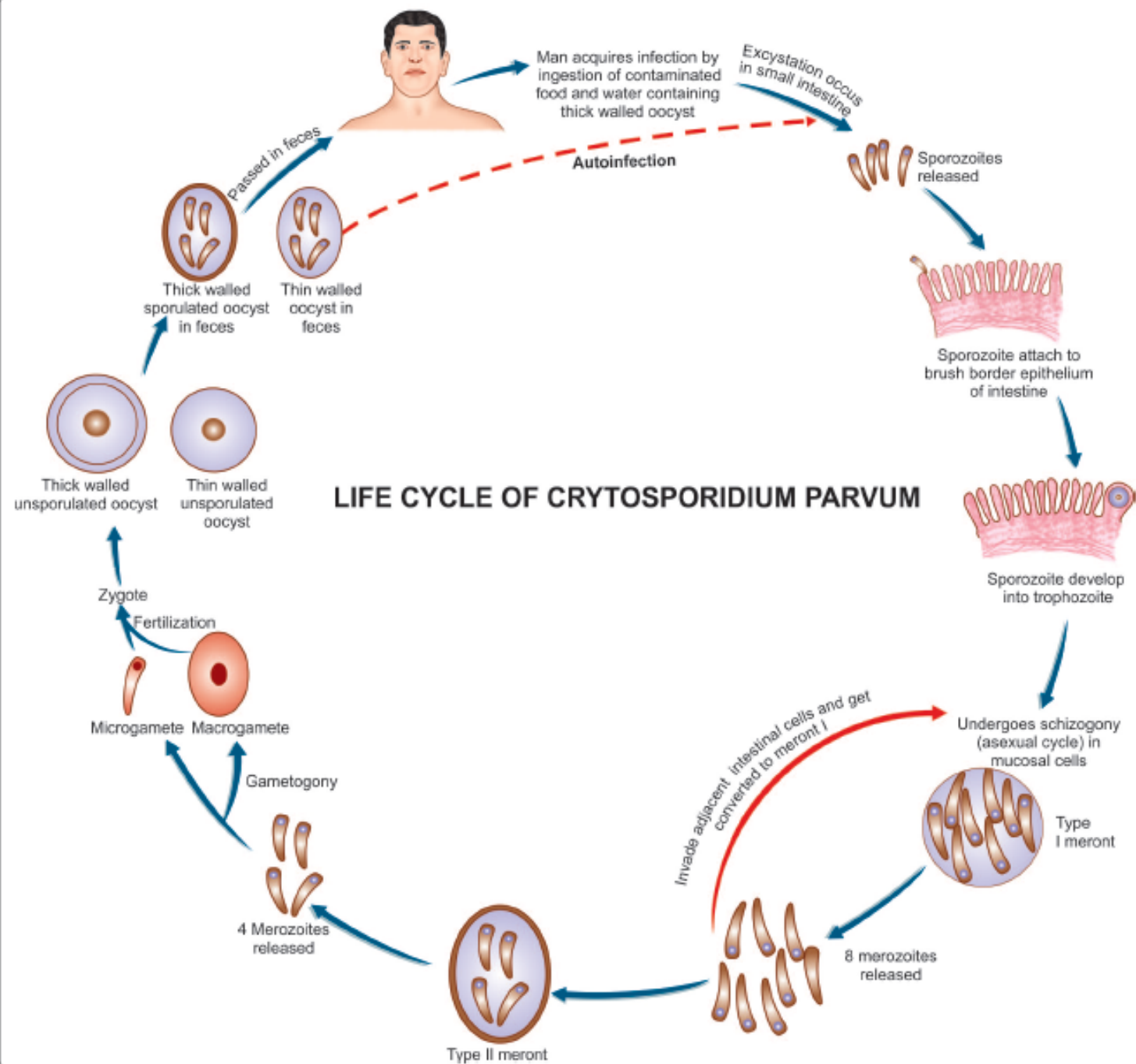


**FIGURE 7-10** Modified acid-fast stain,  $\times 1000$ ). Arrows indicate *Cryptosporidium* oocysts, each containing four undefined sporozoites. Note dark-staining granules.





**LIFE CYCLE OF CRYPTOSPORIDIUM SPECIES**



**Fig. 7.8:** Life cycle of *Cryptosporidium parvum*



REMEMBER... YOU ARE A DOCTOR ☺

Show respect  
to everyone

Use good manners  
and language

**RESPECT**

Be considerate  
of feelings

Never bully, hit,  
or hurt others

GOOD

LUCK 😊 😊



BY: ALI

MAHMOUD